

THE MAGAZINE OF PRACTICAL FICTION

January

WONDER Stories



HUGO GERNSBACK Editor



"THE SOULLESS ENTITY"

By Anthony Pelcher

Other Science Fiction Stories

In This Issue

"THE SATELLITE OF DOOM"

By D. D. Sharp

"THE FLAMING CLOUD"

By Edsel Newton

"The OUTPOST on the MOON"

By Joslyn Maxwell

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WONDER Stories

THE MAGAZINE
OF PROPHETIC FICTION

Vol. 2, No. 8

January, 1931

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WONDERS OF THE VACUUM

By HUGO GERNBSACK



LL nature abhors a vacuum." So runs the well-known saying, attributed to Descartes; although it probably was used long before Descartes was born.

Like many similar popular sayings, that under consideration may be classed as almost completely false. Indeed, all nature does not abhor the vacuum; quite the contrary. Well over 99% of nature (that is, the entire visible and invisible universe) is itself a vast vacuum. All the cosmos, with the exception of the widely-separated locations filled with matter such as the suns and planets, is a void and this void itself is an extraordinary good vacuum.

Science today knows that, if you rise 1,000 miles above the surface of the earth you will find as high a vacuum or better than that contained in an up-to-date X-ray tube; which is about as good a vacuum as can be produced with our most modern machinery.

Indeed, if it were not for this almost perfect vacuum, which constitutes practically the entire universe, there would be no such thing as the motion of the heavenly bodies. The earth and all of the other solar planets maintain their perpetual motion around the sun for only one reason, and that is because the planets move in a perfect frictionless medium—a vacuum.

If there were no such vacuum, the planets, with their satellites, would long have come to a standstill.

Let us suppose, for example, that the entire visible universe were filled with a fairly good, though not perfect, vacuum, such as that found in our incandescent lamps, where quite a few air molecules are left. Then the friction they set up against the motion of the planets would be sufficient to retard them as well as the other heavenly bodies and they would have stopped moving aeons ago. The mere fact that outer space is such a good vacuum is the reason that the heavenly bodies will go on circling in their orbits for millions and billions of years without being impeded in their flight.

Furthermore, we know what happens when a meteor strikes the upper reaches of our atmosphere, which in itself is a fairly good vacuum, but not a "hard" one. The meteor is almost immediately consumed by the terrific friction set up. Now the earth, as well

as other heavenly bodies, move as fast or faster than the average meteor, and if they did not move in such a perfect vacuum, they would be consumed in short order by the terrific friction, if their motion was not slowed down before.

Of course, to the human being, the idea of the vacuum may be appalling because we cannot picture ourselves living in anything but air. We are in this respect much like a fish, who, deprived of his water, will soon asphyxiate. So if we ever visit outer space, we must provide ourselves with our own atmosphere and wear air-proof helmets and clothes, otherwise we would not only suffocate but suffer much worse dangers.

The human body at sea level is constantly subject to an atmospheric pressure which amounts to 14.7 pounds per square inch. We are like deep-sea fish who at the bottom of the ocean are constantly subject to a terrific pressure. Balloonists who have ascended to the highest part of the atmosphere that could be reached, which is only a trifling 39,000 feet, are always troubled by nose bleeds and blood spurting from underneath their finger nails. If the same balloonists could ascent only a mere twenty miles above the surface of the earth, they would almost explode because the skin, no longer subject to the atmospheric pressure, would probably burst open, and the blood working internally at a high pressure would in addition flow from all the human orifices. This provided always that there is a measure of heat.

A number of science fiction authors have mentioned the dangers of a lack of pressure on the human body in their writings, and stressed the point that human beings would summarily explode if ejected from a space flyer into open space.

This idea is open to some controversy, for the writers have left the terrific cold encountered in open space out of their calculations. It is my opinion that if you eject a human being without protection from a space flyer, he will not have sufficient time to explode because he will probably be frozen solid instantaneously. At best, the effects of the lack of pressure, such as the blood squirting from the skin and orifices, will not get very far before the body is frozen solid by the absolute lack of heat, the body temperature shooting down perpendicularly to nearly absolute zero, or minus 273 degrees Centigrade.

The Satellite of Doom

By
D. D. Sharp



The drawn face of the old man pressed against the glass. There seemed to be a hopeless bravery in the haggard features.

While A World Waited Breathlessly The Satellite Went On and On, Repeating Its Circles of Doom!

CHAPTER I

J UST before they reached the front steps Professor Mullin stopped and touched Clifford on the arm.

"There is one man you must watch."

"Who?" Clifford asked, still occupied with the crisis ahead of him.

"Briggs. Rothberg calls him BB, but he isn't an air gun charge at all. He is buckshot with a full charge of smokeless powder behind him."

"Just what do you mean?" Clifford asked with interest awakened.

"Briggs is a keen chemist, maker of models for Rothberg's would-be inventors. He is Police Commissioner with a strong political influence and he is the husband of Rothberg's only daughter, ambitious and dangerous. Don't let him know how much money Rothberg is thinking of putting into your scheme."

"What does he look like?"

"Tall and unforgettable. Not much of a description, eh?"

"Well, I don't know about that. There aren't many men who are unforgettable as far as personal appearance is concerned."

"Briggs is. He'd impress the most phlegmatic; a deep growl, large protruding black eyes, overscored with crow feathers. He drops into these meetings sometimes. I hope he doesn't come in tonight, but if he does, ramble off on some unimportant detail. He might queer your whole plan."

"Would Rothberg allow him to interfere?"

"No. Rothberg doesn't take dictation from anybody. But Briggs is buckshot, remember that, and I believe he suspects what's up."

They mounted the steps and followed a footman to a long room, down the center of which ran a polished table.

Clifford's zero hour was at hand. He knew by reputation every man around that table. They were all outstanding men in their particular fields of science. Directly in front of him sat J. G. Reed who had more than once startled the world with ideas of matter and space; next was Played who

experimented with rockets; Stortz the astronomer who had at last proved the rotation of Venus; Gertz the electrical wizard; Gurly, who had explained the apparent discrepancy in the ratio of gravitation between Mercury and the sun; Ralls, who had taken the new tidal theory of the formation of the earth and blown it to smithereens; Phillips who had set forth a complicated thesis which had grown out of Einstein's Relativity, and a half dozen others. At the head of the table was, of course, old Jacob Rothberg, who, with the magnet of his money and personality had assembled these filings from the fields of science.

Clifford caught the pale eyes of Professor Charles of Rothberg University appraising him. He felt a personal antipathy in that cold, passionless stare and it upset him so he barely heard the opening of Rothberg's address. Even as he heard Rothberg calling upon him to explain his plan, he retained the uneasy sensation that the Professor was coolly dissecting him.

He shook off the uncomfortable feeling as he rose and the double row of white faces about the table turned toward him. His big moment was at hand. He started speaking looking straight at Ralls, for Ralls flourished upon his reputation as an iconoclast, and would, of course, maintain his position as a breaker of idols and a destroyer of dreams. Ralls' lean features were ravenously alert as Clifford began.

"Gentlemen, my proposal is to launch a ship just beyond the atmosphere so that it will form a satellite of the earth. It would need no refueling and no additional power, except that required to send cargo to and from the ship."

BACK of Ralls a door opened and through it a man glided cautiously, stopped and closed the door behind him.

Undoubtedly it was Briggs. The man's whole appearance was strange and unforgettable.

Clifford hesitated, and then decided to go ahead and pay Briggs no attention; but he did not have an opportunity. Professor

Charles rose, placed the tips of his long white fingers spiderlike upon the manuscript below him and cleared his stringy looking throat.

Clifford was taken aback at the double interruption and folded his arms and waited calmly for what the psychologist had to say.

"Mr. Peterson," Professor Charles whined in a high, fine voice, "How do you know, or we know, that it is possible to project a ship beyond the field of gravity of our earth?"

"Sure," Briggs growled in that deep bass of his, "That's the berries! All he wants is to spend some of the governor's money!"

Rothberg hitched about in his chair to face his son-in-law, but the hard stare in the penetrating old eyes brought only a stubborn resistance. Rothberg signaled unmistakably for Briggs to leave the room and fire flashed between the two as Briggs leaned casually against the marble wainscoting and extracted a cork-tipped cigarette and stuck it between his lips.

Rothberg half rose from his chair and roared, "BB you get out!"

Briggs drew himself erect, his cheeks flaming; then he sent a long cloud of defiant smoke in Rothberg's direction, shrugged his shoulders and growled in his bearlike bass:

"All right, governor.
Then he left the room.

Clifford turned his attention back to Professor Charles and continued.

"Of course it is impossible to fire any projectile totally beyond the earth's gravity. Newton has shown that each body in space is attracted to every other according to their masses and the inverse ratio of the square of their distances."

"So, so," the professor coughed slightly, then took his glasses from his nose and held them as a pointer in Clifford's direction as he continued.

"But one can not get around the fact that you would have to send your ship far enough from the earth to enter into cosmic space if it is to float continually without falling. How do you know that you can project anything that far? How do you know how far that is?"

Clifford tried to be patient, but it was quite evident that however eminent Professor Charles was in his own line, he knew very little of astronomy.

"Bodies do not float in space," Clifford began. "They are pulled toward each other. What keeps them from flying together in a huge mass is their velocity, which is much greater than that of a

highpowered rifle bullet as it leaves the gun. They move with hurricanes of speed which would belittle cyclones. It is this that overcomes the pull of gravitation."

He reached into his pocket and extracted a small rubber ball which was attached to a rubber string.

No idea more startling in the history of our earth has been proposed than that put forward by Hermann Oberth, the German rocket expert. By sending a rocket aloft some four or five hundred miles above the earth and giving it a speed of about 5 miles a second, Herr Oberth states, the rocket will circle the earth until eternity without further expenditure of power! A terrific idea, filled with the most stupendous possibilities for the people of the earth. It may revolutionize transportation, or warfare; it may even change the whole course of our lives.

But although it is an idea filled with the most dramatic and adventurous suggestions Mr. Sharp does not want to deal with them fantastically. He has written instead a story of intense realism sticking close to life and truth, with characters that live and breathe. And so he has made this story as vivid and understandable as is humanly possible.

"You will notice when this little ball is idle it hangs toward the earth."

He began to whirl the ball around and around and it went humming over his head.

"When enough speed is attained gravity is overcome and the ball rises into the air. To make the illustration plain, let the string be the pull of gravity and my thumb be the sun."

He whirled the ball faster. The rubber string stretched, as he went on.

"When the speed of the ball increases, the orbit increases. It stretched the pull of the rubber 'gravity.' When the speed decreases the orbit narrows. This illustrates simply the forces which hold every body in space to its proper place.

"Any body moving around the sun with a speed less than 18.6 miles per second must have an orbit smaller than that of the earth, and one having more than 18.6 miles per second would have a larger orbit than that of the earth, while one with a velocity of exceeding 26 miles per second would fly away from the sun for good.

"Now, suppose we fire a ship from the earth so that its speed is 18.6 miles per second. At that velocity it should pace the earth forever and apparently move across the earth's surface from east to west as the earth turns on its axis. That ship should make one trip about the earth every twenty-four hours."

A Gigantic Plan

HE paused and let the little rubber ball hang idly from its string as he glanced at the studious faces regarding him. Then his glance went back to Ralls, who had leaned forward, elbows upon the table, chin wrinkled into the palms of his big hands,

fingers working upon his lean cheeks. He was smiling tolerantly and yet there was something belittling in the expression of his eyes. He impressed Clifford as a strong man who had braced himself to wrestle with an iron weight and just discovered it was cork.

"Your illustration is interesting, but your astronomy is faulty," Ralls drawled with rather a bored air. "Everything upon this earth is moving around the sun at a velocity of 18.6 miles per second. A ship placed just outside the earth's atmosphere and given that velocity and no other would fall at once."

Clifford saw his mistake. Certainly the ship would fall, and the flaw in his theory rattled him for a moment, so that he was unable to correct his error. While he strove for poise, the bulky, rather awkward form of Stortz hitched about and the big-faced astronomer smiled encouragingly. Clifford felt a rescue at hand.

"Mister Ralls," Stortz drawled in slow, rumbling accents. "Our young friend is not so very much in error. His mistake is



D. D. SHARP

starting with the wrong objects. It is not the gravity of the sun the ship must overcome, for that is already overcome through the inertia of the earth. Our problem is the law of small bodies moving around large bodies. Fortunately this simplifies, rather than complicates, the question. The ship need not be fired with a velocity of 18.6 miles per second to form a satellite of the earth, but with a speed of only 4.90 miles per second.

"While I don't want to lend my opinion, as yet, for or against this young man's proposal, I will state that Oberth, a German scientist, has given considerable study to the question of rocket ships, and he claims

that he can develop a vehicle which will fly from Europe to America in thirty minutes, and he believes it possible to build a space ship which will travel at a velocity of about seven miles per second, almost double that required by the ship proposed.

"I might add that Professor R. H. Goddard, the American expert, has made a powder rocket which ejected gases of 8000 feet per second, and Opel claims to have invented a liquid three times as powerful as any powdered fuel, so our goal may not be so far off after all."

Ralls pursed his lips. Then he turned on Clifford.

"All right," he snapped, "Grant that your space ship can be shot with enough velocity to continuously circle the earth, how are you going to get your freight aboard? Even should you contrive to get the packages up there, don't you know that inertia would carry them on in orbits of their own without your ship?"

"My plan is to have a system of rockets at each city under the path of the satellite. These rockets would have compartments for storing mail and express and would be timed to be fired at the exact fraction of a second to make contact with the ship."

"What is the need of a ship?" Ralls interrupted. "The rockets would circle the earth of their own speed."

"With no ship," Clifford answered, "the packages could never be brought down at all. The purpose of the ship is to provide a buttress against which a timed discharge in the end of the rocket can be set off to kick loose the rocket at its destination. The ship, you understand, is not to be a container in the sense of an empty hull. It is to be a steel cylinder against which the rocket can be shot. These rockets will have clocks timed for the discharge of their gases and the rockets will be strongly magnetized, which will assist them in making contact with the ship and will hold them firmly in place until the reverse discharge takes place. The rockets are also to be equipped with folding helicopters, which will automatically extend and break the return fall so as to prevent injury to the rockets or
ress."

CHAPTER II.

Rothberg Speaks Out

HE paused again, for his words seemed falling on a cast iron personality. Ralls was shaking his woolly head, and Clifford's heart sank as he saw affirmation of Ralls' position in the faces of at least three of the scientists about the table. He hoped that Stortz would come again to his rescue, but the old astronomer, while still regarding him kindly, seemed lost in thought. His glance caught Rothberg, who had been sitting silently erect at the head of the table. His whole manner seemed suddenly changed. His eyes were sparkling and alive and he jabbed at a button beside his chair.

A girl came through a small door at the right. Clifford first took her to be Rothberg's daughter, then he saw a stenographer's notebook and pencil, and he decided she was a secretary held overtime for this meeting.

She was neat, rather stylishly, yet quietly dressed, except for a dash of color at her neck and sleeves, and an orange sash caught about her slim waist. She took a small chair which Rothberg himself dragged toward her, and then opened her book, giving the men about the table no more than a quick glance.

At the time she did not impress Clifford as being more than an ordinary pretty stenographer. He was not at all interested in her, but in what Rothberg was about to dictate.

"Crystal," Rothberg began quickly with a curtness in his tone left over from his conflict with Briggs. "Please take down these notes and ask Robinson to look over them with view of formulating a contract."

"Mr. Rothberg," Professor Charles was on his feet.

Rothberg glanced up and scowled.

"What is it, Professor?"

Again Professor Charles had his glasses between thumb and forefinger, pointing them this time at Rothberg.

"Have you taken into consideration the

likelihood of a condition of neurosis in the applicant?"

Rothberg rose from his chair, and stepped to one side of it. Professor Charles sat down leaving his sentence incomplete, but still pointed his glasses as though holding them ready for instant use. Rothberg smiled tolerantly and Clifford knew the objection had fallen as lightly as dust.

"You sound too much like Freud," Rothberg drawled. "We are not dealing with psycho-analysis, but mechanical and cosmic laws."

He turned and faced the whole attentive board. His eyes lost their twinkle and his lips forgot to smile. Instead there seemed to be a fire of inspiration growing slowly; idealism lifting the materialist above himself.

"Gentlemen," he began very quietly, "This is one proposal I am going to take on without waiting for you to fit every angle and line into place and pronounce Q. E. D."

From that point on to the close of his speech his eyes burned more and more brightly and his voice became more earnest.

"Most men," he concluded, "desire to create something which can be left to oncoming generations with the mark of their individuality upon it. One may conclude this is all vanity, but I believe every great work which preserves the marks of genius sets a standard for future generations which it defies them to excel."

"Sitting there listening to talk of cosmic law it has occurred to me that this young man's dream may be used to leave an imperishable remembrance of us who live today. Once upon a time, a Pharaoh, hoping for immortality, raised the Great Pyramid of Gizeh; but lasting as that is, it shall in time perish, so too shall all the light fabric of our own civilization. But the ships we launch into space shall never decay. They will speed on and on a lasting inspiration to generations yet unborn!"

CLIFFORD caught the fire of Rothberg's idealism and mixed it with the flame of his own dream, but a damper was thrown

upon it immediately for Briggs thrust his thin, inquisitive face through the door, gave one keen, searching look about and retreated; but before his face disappeared Clifford saw a glaring threat turned upon the girl who looked up just in time to catch it. She shrank from those black eyes and Clifford watched her rather than Briggs. It seemed that she was fighting to show no fear; but her tightly drawn underlip betrayed her.

When Clifford looked again toward the door, Briggs had gone. He wondered what the man meant and Rothberg added importance to the incident by getting upset over it. Before that he had seemed aloof, as though he was in a world unaffected by men and their petty ideas; but now he searched every face as though worried whether they had penetrated a secret of the family closet. When his eyes rested on Clifford they resumed some of the old fire and zeal he had shown while making his short speech. He turned quickly and spoke in a low tone to the girl. She gathered up her notebook and some papers and left the room.

Professor Mullin caught Clifford's hand when they were again outside the hall.

"I knew you'd win, my boy! I knew it! But I must admit I never suspected old Rothberg had such a touch of sentiment in his makeup."

"Here's the car," he added as Rothberg's limousine drew to the curb.

Clifford pulled himself from his reveries and tried to keep up his part of the conversation. He was very grateful for Professor Mullin's help. Had it not been for him very likely he would still be working back of a glass covered desk at thirty-five dollars per week, dreaming of space ships that should never be launched. Yet he had not a word to say. His thoughts seemed bound to that hall with its long polished table and a smart looking girl trying to appear composed under the threat of a tall black-eyed man one never forgot.

And that night he went to bed not entirely happy. He was worried for fear that Briggs would do something to upset his plans. Three days later, however, he felt

more secure about the venture, for he met Rothberg and his attorneys down town and the contracts were actually signed and the work put under way.

Only once in the three months that followed did he see the girl, and that was a chance meeting in the hall of Rothberg's home. She smiled and bowed her head slightly, her gray eyes friendly, and then she was gone.

The end of those three months found the ship almost complete and the time drew near for her tryout. The morning he got this news, Clifford went down to lunch so absorbed in a letter from Rothberg which gave him the details, that he hardly heard the blatant cries of newsboys in the streets. Nor did he make out the meaning of them until a small fellow with big blue eyes thrust a paper under his nose and shouted,

"Extra mister! Extra! Big banker disappears!"

Clifford took one and idly glanced down at the picture. Rothberg! Hardly understanding what the picture was about he glanced at the headlines.

Some of the import of those words seeped into his shocked brain as he stared down unable to read on. Then a dull hurt possessed him. He thought of how well he had grown to like the millionaire in the short time he had been associated with him. Then it came to him that this meant the upsetting of everything connected with launching the ship. Briggs flashed into his mind. If the space ship being almost ready to launch had anything to do with the time of Rothberg's disappearance, Briggs might be back of it.

The boy nudged him. "Five cents, mister."

Clifford pulled a coin from his pocket and dropped it into the stubby palm. The boy ran on shouting, "Extra! Extra! Big banker disappears!"

For a long time Clifford stood there stunned. His house of cards had tumbled about him. His dream was only a dream after all, his plan only a scheme. The new light in his life was not a beacon at the port of success, but just a flare of illusion somewhere across the strange darkness of failure.

Not for a second did he have any faith in Briggs' going ahead with the work. Briggs wasn't the kind to spend a great sum of money helping other men attain their dreams, and his hand seemed all too plain in this. Clifford knew Rothberg had made provision for carrying on this work in case of his death, but since he had only disappeared the delay in the work would probably be dragged out indefinitely. That would be like Briggs.

A Strange Call

FOR a long time he stood letting his thoughts wander on and on. Men and women flowed past in an endless procession, propelled back and forth through the heart of the city. Cars honked beyond the curb, traffic congested and moved again as the bell rang and the lights changed. No one paid him the least attention, he, who had been so sure a few minutes before that this strange, restless, congested mass of human beings should know him and acclaim him.

Now he was one of them again an unknown in a mass of unknowns; just a corpuscle in the veins of the city. He felt he would never reach the heights of his aspiration, never see his rockets flaring against the heavens. He must plod, lift and place, lift and place again, eight hours a day, six days each week fifty-two weeks each year, until some day another mannikin would be put in his place to carry on the unending drudgery of life.

The paper dropped from his fingers. A puff of wind caught, twisted it, and whisked it aloft, high above the heads of the industrious mass, then let it fall into the streets where it scuttled along under the shuffling feet of the unseeing horde. It lay there, restless with each new gust shaken but unable to rise again.

Staring at that paper with its warrant against his dreams, he remembered Freud and the psychology of grandeur and dreams. Like a good many other men of imagination, he had believed in his luck, in his allotment to play a major part in the scheme of things; felt, somehow, that he was a man born to walk among the mighty.

He shrugged his shoulders in an attempt to be resigned.

"Rothberg disappears!" Up and down the street newsboys cried his doom; cried it lustily with a trill of elation for the pennies they were getting. "Big banker disappears!"

Pennies, pennies for lollipops or tops, or, what did it matter, the big news they had not at all.

He turned back and unlocked the door, crossed his room and caught his image in the mirror. He was astonished at the apparent change in himself. The evidence of defeat in his features whipped him to a new determination. He would fight on! He drew his shoulders erect and grinned. The wrinkles caused by the laugh looked odd against his ashy face. He sat down upon his bed.

Thoughts chased each other around in endless procession. The hands of the tiny clock upon the table crawled around the dial. The telephone bell against the wall tinkled. Now that he noticed it, he believed it had been ringing a long time. He lifted the receiver and answered in a voice that was thin and hollow.

"Mr. Peterson?" a girl asked.

"Yes. Who are you?"

"You don't know me by name. I took the notes for the conference the night your plan was adopted."

"Yes, yes. Certainly I remember you."

"Please come out here just as soon as you can. Everything depends on it."

"All right. I'm coming," Clifford answered, wondering at the calmness of his voice. "Are you at the Rothberg place?"

There was no answer.

He fumbled in the directory for Rothberg's phone and found it was not listed. For the life of him he could not remember the number. He asked information but she refused to give it to him.

Uneasiness grew the more he was balked, but there was nothing he could do only hurry as fast as possible to the Rothberg place.

He caught the elevator, rushed into the street to hail a taxi.

Crowds were swarming about the walls

which enclosed the estate when the taxi drew up at the curb. Beyond the walls all seemed quiet enough, and there was little to indicate possible tragedy, except two stolid men in uniform at each side of the front steps, and a few brisk men entering and departing.

Just as he left the cab, Briggs came down the walk.

"The very man I wanted to see," his big booming voice stopping any attempt to evade him.

BRIGGS was the last man Clifford wanted to see but he followed him into the house. In the board room Briggs closed the door and turned on him.

"Of course you've heard."

"Yes," Clifford admitted, watching him intently.

"The old man must have known he was in danger," Briggs went on. "Yesterday he asked me to carry on this work should anything happen to him. Told me he wanted the ship to be a monument to him."

"Yes," Clifford assented absently, thinking of this new puzzle. Why was Briggs telling him this? Was he really going ahead and launch the ship? If so, that indicated he must have nothing at all to do with Rothberg's disappearance. Then who did?

As he stood thoughtfully wondering about the new phase of the situation, Briggs turned on him aggressively.

"Peterson, you've no business out here. I want you to let this affair alone."

"All right," Clifford agreed coolly, "I will when I find what became of Mr. Rothberg."

"Better not meddle," Briggs growled, "After all your ship is all that interests you."

"I don't like your tone, Briggs," Clifford said.

"You'll like it a sight less if you meddle here."

"I'm not meddling," Clifford answered becoming more irritated. "I had a reason to come here."

"Yeah, I know. She phoned you. I'm onto her game too. Now, you get this

straight. If you love your life you stay out of this."

"Is that a threat?"

"That or a promise, take it as you choose."

Briggs hunched his shoulders and doubled his fists. Clifford didn't want to have a knock-down fight in the man's own home, so he turned his back and strode from the room. He smiled a little, his sense of humor saving the situation. Surely Briggs ought to know he was no match for him that way.

"Get out then," Briggs called angrily, "and keep away from Crystal. When I want you I'll get you, remember that."

Clifford went into the hall wondering at Briggs' jealousy over the girl. She did not appear to be the type who would put herself into Briggs' power nor one who would carry on an affair with him.

In the hall he found her waiting for him and a big load of worry left his mind.

The tragedy in the house seemed to make her more reserved. There was a touch of somberness in her dark coat suit and Clifford missed the flashes of color she had worn at her neck and waist. He wondered if this overtone of black was her usual business habit or if it hinted that she believed Rothberg dead.

She did not smile, though there was an evident relief in her face when she saw him. "I'm so glad you came," she said.

"I hurried," he answered taking her hand, "You hung up so abruptly I was really worried."

"Let's talk in my little office," she interrupted quickly.

"Wherever you wish," he agreed.

He followed down the hall and found himself in a small room fitted with stenographer's desk, a filing cabinet, and two chairs. She seated herself at the desk and he sank into the other chair, which was evidently the one Rothberg used while dictating.

"I'm not the regular secretary," she said briefly, "but I do most of his personal letters. He can trust me better than anyone else."

CHAPTER III.

A Dangerous Situation

CLIFFORD noticed that she did not call Rothberg's name. Evidently it would have been a task for her to mention it just then. Certainly he and she were very close to each other. Well, Rothberg had excellent taste and he did not blame him for hiring her. He did wonder though, just how much she cared for the millionaire and how much for his money. Then he put that thought from his mind. He felt it was unjust to her. Whatever her connection with the banker, he felt it must be sincere and unaffected by his wealth.

"About the phone," she reminded him, "That was queer. Your voice was cut off like something or someone had cut the wire. I tried to get central again and she would not answer. Then I went upstairs and that phone was dead too."

"Aren't there other phones about the place?"

"Yes, one in BB's laboratory and one in the servants' quarters."

"Did you try either of them?"

"No—" she hesitated, "Truth is, I didn't want the servants to know. I started down to BB's laboratory and something seemed to hold me back. I don't like to acknowledge it, really it's silly, but something seemed to warn me to stay out of there. I don't know why I felt like that. Maybe it was because BB acts so queer of late."

Clifford got out of his chair. "I'll go down and find what's wrong."

"No," she cried, "You must not."

"Why?" he asked hesitating.

"BB. He'll do anything now. He even puts his own guards at my door."

"Mr. Rothberg will rip him inside out when he comes back."

"Oh I do wish he'd come back. I am terribly worried about him."

"No one would dare harm him," Clifford assured her, though he was not quite so sure himself. "He is probably kidnapped to delay launching the ship."

"Maybe that is all, but BB acts so strange. He dares things he never dared

before. He threatens me in a way which makes me really afraid."

"You think—Briggs killed him?"

She winced, paled slightly and then said, "BB resented the outlay from that first night. Last night when they were together in here he told BB he would spend his entire fortune or make a go of the satellites. BB agreed with him, but too readily. I know now I should have done something."

She stopped talking and her head bent forward to hide her face. It was plain she was losing her magnificent control, but after a moment she went on: "That was the last time anyone saw him. They went down into the laboratory to look over the ship. This morning the butler told the police that he had seen him go into the street about nine o'clock last night, but I believe he is lying."

"Have you told anyone what you suspect?"

"There was no one I could trust."

"If the butler is lying, Mr. Rothberg must still be down in the laboratory!"

"Yes, somewhere down there."

"Then why was he not found?" he exclaimed.

"You don't know BB," she said with a pronounced agitation. "He has drugs and chemicals which will do unbelievable things!"

"I don't like to leave you alone," he said with evident concern as he got out of his chair, "but Mr. Rothberg may need help. I'll be right back."

"Don't go down there alone," she warned and lowered her voice as though she suspected someone was listening. "Not the laboratory! You'd be at his mercy."

HER concern thrilled him. He let his eyes linger on her, watched her black pupils grow wider and wider. Puzzled at the way he affected her, and then with some chagrin he saw that her eyes were not upon him but that she was looking over his shoulder at something behind him; that her eyes were not widening with love but with terror.

He whirled about quickly and found Briggs peering through the partly opened

door. Clifford gave him one disdainful glance and deliberately turned his back. The girl pulled at the hem of her short skirt and toyed carelessly with a paper cutter.

Clifford was sorry for her. Briggs was using his position in the home to act a beast.

"I hear the ship is ready to launch." Clifford said the first thing that came into his mind, anything to divert Briggs from the girl.

"Tomorrow," Briggs declared and his tone was defiant as though he expected Clifford to object.

"Don't we wait for Rothberg?" Clifford demanded.

Briggs stepped forward until he towered over Clifford who leaned upon the desk.

"Tomorrow, I said," he snarled: "Not a day later!"

"Then it is ready?" Clifford asked, his nerves tightening, "May I see it, Briggs?"

Briggs regarded him with an uncertain suspicion, then seemed to arrive at a decision and turned toward the door.

"Come on," he growled.

Clifford followed but felt the girl's hand upon his sleeve.

Briggs whirled and there was a dangerous fire in his eyes.

"Get on," Clifford commanded. Briggs shot a threat over his shoulder and then went striding down the hall.

In all the months that Clifford had worked with Rothberg and Briggs correcting flaws and inventing schemes for improving the ship, he had been refused a glimpse of the work. Briggs had insisted on keeping him out of the laboratory and his whole knowledge of the ship's progress was obtained from blue prints and small models. So when Briggs opened the door of the shop and went down a short flight of stairs, Clifford peered eagerly over the maze of pipes, machinery and belts, to rest upon the ship which was near the rear of the building.

She was indeed an engaging vessel. Night was just settling and the soft radiance of her luminous paint glowed against the shadowed walls. Clifford knew then why

Rothberg had planned to send her out at night. She would make a spectacular departure!

"All loaded and ready for contact," Briggs rumbled as he pressed a button.

The wall beyond seemed to resolve itself into great doors which slid open to provide a hole large enough for the exit of the two-hundred foot torpedo-shaped ship. New track gleamed below the ship and ran out into the trial yard.

"We'll make the experiment here. The first the world shall know of it will be the flash of light as it shoots across the heavens to circle the earth!"

"I hope it does, Briggs. It would ruin me should it fall."

"You said it couldn't," Briggs exclaimed hoarsely and stared at him in astonishment.

"That's my theory, Briggs. Only the experiment will tell for sure."

"It mustn't," Briggs raved, his whole attitude showing unparalleled concern. "I won't fire it if it's likely to fail. I'll have her dragged to the river and sunk first."

Trapped!

"I didn't mean to intimate that we would fail, Briggs. Of course we won't give up even if this one doesn't take off. In that case we would have to tear her up and find what was wrong, then try again."

"No," Briggs declared, staring at the floor. "I'll have her drowned. We'd be the laughing stock of the whole world."

He jabbed at the switch and the doors closed. He turned and gave Clifford a quick, searching look, crafty with some hidden anxiety.

"Peterson," he finally said, "You've a future ahead of you. You have already devised some things which should make you famous when they are widely known."

He lowered his voice and gave a cautious glance around the dimly lighted room.

Clifford was annoyed. Why was the man whispering. There seemed to be no one down there to hear him even had he shouted.

"I've made a discovery or two, myself,"

Briggs went on, "Something deep. Something which has to do with the basic laws of life!"

"No?"

"Sure."

Clifford was instantly alert. Here seemed to be a chance to get Briggs to talk. He was anxious to find out how sane the blazing-eyed chemist was.

"What have you discovered?" he asked.

"Shhh! Not so loud. It's a secret. I haven't even told the governor. Not a soul. But I'll tell *you*."

Clifford stiffened expectantly and after a moment Briggs went on.

"Of course you'll admit that life is no more than chemical action."

"No, I don't," Clifford objected mainly to draw him out.

"You don't know that?" Briggs questioned fretfully.

"Oh, I'll admit the physical part of life is chemical," Clifford said soothingly watching Briggs closely. "But there is more to life than the oxidation which takes place in the body. What about intelligence? Spirit, if you please? We chemists can make a particle of matter wiggle, whistle, sing and even talk, but we have never made it feel or think!"

"Of course," Briggs drawled absently, "But it is the chemical part of life I am experimenting with."

The glitter in his black eyes was now more metallic. "I have discovered how to produce flesh, live flesh, Peterson!"

Clifford clenched his hands and stared at the cement floor. He could not trust himself to look at Briggs a moment longer. He felt sure then that he was on the trail of Rothberg, dead or alive.

Briggs droned on, "In my vault I have something that will interest you; made of minerals and treated with chemicals; flesh! Human flesh, and it bleeds!"

Clifford had no doubt by that time that Briggs was entirely mad, and that he had either killed Rothberg outright or was using him for some horrible experiment. He did not know whether to answer or remain silent. One bit too much interest might scare Briggs and one bit less might stop

the wild ramblings. Briggs hesitated and Clifford said, "You're a wizard if you can do that."

He wondered if Briggs noticed the strain in his voice.

"I've done it!" Briggs flared.

"Science asks proof."

"You want to see it," the crafty anxiety was growing in the black eyes. "Come on, I'll give you a look."

Briggs strode off down a lane between the machinery and Clifford followed him closely, hoping that he would find Rothberg alive.

They reached a large vault of masonry and steel. Briggs swung open the door and stepped inside, Clifford close at his heels. Briggs turned on an electric light.

"There!" he cackled, pointing to a glass case at the far end of the ten-foot vault.

Clifford gasped.

In the long glass case was something which might have been a man. It was nude, terribly bloodsoaked and lacerated.

ROTHBERG? With two quick strides he reached the case and peered in. The body proved to be nothing more than a mannikin of flesh-colored rubber, daubed here and there with red paint. He whirled around sensing a trap. Briggs was gone and the big steel door of the vault was closing! Briggs had been too keen for him!

He stepped back and regarded the gray steel bolts of the door as they glistened under the light. He knew the strength of that chrome steel. The inch thick tusks were shot solidly into the frame and there was no way on earth he could drive them back.

He was chagrined at how easily he had been duped, even with the warning the girl had given him. Truth was, he had not believed Briggs was quite so diabolical and vicious as she seemed to think. Now it proved she had been quite right and he was too late in realizing it.

Hardly hoping for any means of escape, he searched around the small room. There was a lot of chemical apparatus on the table, and the walls were lined with steel shelves fitted with filing boxes.

Clifford pulled down one of the files. It was heavy. He opened it. Inside were typewritten manuscripts and blue prints; scientific stuff, the records of experiments which Rothberg had financed.

No doubt the records of his own scheme were here and he went carefully through the file hoping to find them and get them away from Briggs, should he by any chance leave the vault alive.

The first file finished he took down another, and as he searched he stacked the boxes carefully upon the floor. Back of the eighth box was a small round hole in the masonry of the wall. He was completely surprised at finding it.

Mice? Certainly not.

He stepped upon one of the steel boxes to peer closer, and saw that the hole was the end of a galvanized pipe, cut flush with the surface of the wall.

That was queer. Why should a pipe be run into this vault and hidden behind the filing boxes?

Wondering about it he rummaged through the papers in the ninth box and started on the tenth.

He smelled gas. Instantly he knew his peril. This was Briggs' way of getting rid of him! It was also probably the way Rothberg had been dispatched.

The gas fumes hissed through the pipe. It would not take long to finish him at that rate. He took out his handkerchief to plug the hole. But that would never do. He knew Briggs well enough to know that plugging the hole would not beat him. Briggs would take no chances with any escape as simple as that. In whatever room he had his gas lever would be a meter that would gauge the amount of gas entering the vault. Should he plug the hole Briggs would be warned and leave him to starve or would devise some other way to finish him.

Clifford knew if he were to get out alive he would have to do better than just plug the pipe. He would have to let gas flow into the vault. Let Briggs believe he was suffocated; and then surprise him as he opened the door to drag out his body. But how? Already he was dizzy with the fumes.

There was a way and he thought of it!

A desperate method which gave small hope, but he was in a desperate situation.

He struck a match and threw it at the hole. The gas burst into flame, leaping far into the vault and singeing his hair. Then it shrank to the pipe and burned in a long tongue of roaring fire. On and on it burned. The acrid fumes became less pungent, but the air of the vault grew hot and stifling.

He stood helplessly and stared at the hissing blaze, and tried to devise some way to prevent its eating up the air he needed for his gasping lungs.

CHAPTER IV.

Into the Sky!

THE vault became hotter and hotter. He suffocated, his throat seemed parched with fire. He decided it would be better to die by cool gas than by blazing fire. He groped about the vault searching dizzily for something with which to smother the flame, and as he searched he remembered his coming hour of triumph but one day ahead. God, how he wanted to live long enough to launch the ship; to watch it race out into the orbit of its service to the earth. He wanted to protect that strange girl upstairs—he wanted—he wanted—what? Air—just air.

He reeled sank to the floor. The flame above burned on, riding high about the mouth of the pipe, higher and higher as though it were breaking loose from its anchor and trying to float away. Up and down it crept as it fed on stagnant air currents from the floor. And Clifford knew what made it ride away from the pipe. The oxygen in the air was growing thin.

Black night and red flame played hide and seek across his brain. He felt that he was slipping down, down, down, into a deep dark place, lighted now and then with red flares of light. Sprawled upon the floor he breathed in a quick pant like a huge lizard spread upon a jungle floor.

Clifford was not entirely out when there came a noise as of someone working at the door. The steel tusks moved back from their sockets and the door moved. It opened

wider and a flood of fresh sweet air poured in. He breathed greedily and tried to get hold of himself. He felt sure Briggs would be armed and try to finish him. He rose groggily to his knees and doubled his lean fists, waiting like a cornered beast.

A swift figure darted through the half open door, seized his shoulders and tugged at him. He waved his fists groggily in an effort to strike. He heard a faint cry of pain and the blackness seemed to lift again.

The girl was there. Somehow she had found him. He marvelled at her courage, knowing how very much afraid she was to be down there. He marvelled still more at her concern for him.

The fresh air braced him like aromatic spirits. He got to his feet and leaned against the wall. She stepped nearer, her gray eyes burning with anxiety. He smiled weakly.

"Don't worry, I'm all right," he assured her.

"I knew he'd try to kill you. That's why I begged you not to come down here."

"Yes I am dumb, but you rescued me," he said with a bit of chagrin.

"Not so dumb," she denied.

He glanced up to see her eyes regarding the flaming jet. The fire trembled in the mirror of her eyes.

"You outwitted him that time, but let's yet out of here," she added nervously. "He'll want nothing better than to lock us both in."

"Shall I help you," she asked leaning over him.

"No, I'll make it. Go ahead."

She left the vault and he followed, reeling a trifle. Outside she slipped around a black panel which held electrical switches, and then across toward the space ship, which glowed with a weird radiance against the dark, lifeless room. Here and there a night bulb cast grotesque shadows of the queer machines upon the concrete floor and distorted them against the pale gray walls.

"He'll be wild," she whispered.

"He'll never launch the ship now," he said dejectedly.

"Launch it yourself," she declared. "It's all ready."

"Mr. Rothberg?" he questioned.

Her enthusiasm died. She stood silent for a moment and then in a sad, soft tone; "I'm sure he'd want you to. I am sure of it."

"You're right," he agreed, "Why wait when the test can be made now. Do you know the switches which work the hoist?"

"Yes," she said and pressed the button which opened the big doors.

HEY slid back and unfolded a section of clear, moonless sky, alight with the thousand candles of night. She stepped to a row of levers against the wall.

"Contact!" she called like a valiant little soldier.

The hoist growled. The ship slid outward and up along the inclined track, until it was high up in the yard outside the laboratory. She pressed another switch and the cable fell away, another and there was a burst of flashing, spluttering, roaring flame, which howled like a mighty cyclone of chemical disintegration.

The ship heaved upward with constantly accelerating velocity. It went streaking across the sky with a long tail of fire left for an instant in its wake. On and on the monster sped. Faster! Faster! It grew smaller and smaller into the vastness of the heavens.

Cries came from the streets. Shouts! Yells! Questions tossed back and forth, man to man. The space ship was setting the city on its ears.

It gained the heavens, glowing like a big star. It sped across the zenith against a galaxy of ancient stars, moving down toward the rim of the far horizon.

Clifford and the girl stood dumb, humbled with the power man had brought at last into his control. Dumb with the greatness of having created something far more lasting than themselves.

Behind them came the sound of running feet.

Clifford turned to see Briggs, who began to shout wildly.

Believing the man was entirely mad he

reached about for some weapon. But Briggs paid little attention to him.

"Good God!" he was at last understandable. "What have you done? The governor's in there!"

The girl screamed "No! No! No!" She swayed and sank upon the floor, and huddled there as though strength had gone entirely out of her.

Clifford leaned over and laid his arm across her shoulders and felt the quiver of her body as she shook with grief.

"I'm sorry, so sorry," was all he could think to say.

Briggs huddled back through the laboratory crying:

"We've got to stop it! We've got to stop it! The governor's in there!"

Clifford knew how useless was that cry. That ship was like death. One could launch it but there was no known way to bring it down. It was in the control of the cosmos!

"What have I done? Oh! what have I done?" the girl sobbed brokenly.

"We didn't know," Clifford said. "We had no way of knowing. You and I are not to blame. It was Briggs, the scoundrel!"

His words seemed to shake her with new despair.

"Oh, you don't understand! You don't know! I am BB's wife!"

Clifford straightened with the shock.

She—BB's wife? Rothberg's daughter? Why had he not guessed it?"

CHAPTER V

Brigg's Story

CLIFFORD had no doubt BB spoke the truth. Rothberg must certainly be in the steel satellite. Of course they must make a desperate effort to get him out—no expense or peril would be spared. But unless Briggs had provided some means for him to live up there, only the frozen body would be their reward, if they succeeded at all. Hundreds of miles above the earth the ship was as unattainable as though it were at the moon or Mars.

The rockets, of course had been construct-

ed to make contact with the hull, and these rockets were the first things that came into Clifford's mind as he bent over the stricken girl. And still they seemed to offer little hope. They were to be discharged by gases with gradual acceleration, as the ship had been, but constructed of only plate steel they provided little protection against the absolute cold of space (accepting as fact the prevailing opinion that the temperature of space was minus 273 degrees Centigrade, or thereabouts). Even if one could survive in a specially constructed rocket the steel walls of the ship and the hull of the rocket would form a barrier no one knew how to pass.

As Clifford pondered these problems, the girl pulled herself together and got to her feet. She said something, but Clifford could not make it out, for beyond the open doors the street and city was a roar. The whole town seemed turned upside down. The strident honking of auto horns underscored the wild shouting of men and boys. The wail of distant sirens and the low bellow of factory whistles added to make such a bedlam as only a startled city can make.

Clifford pressed the switch and the big doors slid together and muffled the clamor outside. The girl touched his arm and he looked around to see Briggs running back from the dim recesses of the laboratory. As he came nearer, Clifford thought he detected a poorly concealed elation in his bearing as he barked at them.

"I told you not to meddle. There is not a chance in the world of rescuing him alive!"

Crystal ran down the aisle between the grotesque machinery and caught Briggs by the arm.

"BB! What do you mean? Is he still alive?"

"How do I know?" I never sent him off!" he evaded brutally.

"Listen to me!" she cried pulling at him with nervous little jerks. "What was he doing inside the ship?"

Briggs did not seem in the least upset. His smutty eyes rested upon her slight figure with a contemptuous composure that seemed to torment her.

"It won't do any harm to tell you, now," he finally answered. "The governor and I were working on the idea of carrying passengers at some time in the future. I discovered a method of rinsing the carbon from respired air, so that it might be breathed again; a simple little process that will make oxygen tanks unnecessary."

"BB!" she cried, tugging at him again, "Can you stand there and talk of experiments at a time like this?"

"Well, why not?" he resumed and then as though she had not interrupted at all, "The contraption seemed a success, and to prove it, I volunteered to let myself be sealed inside. The old sport refused and insisted on trying it out himself, and since he was boss, I had to let him have his way. He was doing splendidly the last peep I got at him through the plate glass port hole."

"BB!" she cried again, "we're wasting time. Let us all forget everything but him and his peril and get together to find some way to get him back."

"How?" he asked with exasperating doubt in his tone. "All hell can't bring down that ship now!"

"How?" she repeated mechanically and looked at Clifford.

"The mail rockets," he answered, not because he knew a way, but because he wanted to give her hope.

BRIGGS laughed ironically. Crystal whirled on him and Clifford thought she was going to attack him with her small strength. Instead she caught his arm again, then let it go. She shrank away covering her face in the bend of her white elbow.

"You planned it," she whimpered, "You didn't care what became of him just so you got him out of your way. Oh, BB how could you?"

Briggs remained stiffly composed.

"Cut out that sob stuff," he snapped, "I told you not to meddle, and this is what you get?"

She straightened and her arm came down from her face and held stiffly at her side. Clifford saw that her hand was clenched tightly. She faced Briggs as though a wall

was at her back and she was determined to be brave.

"BB," she said slowly, "We would have loved you and given you all that you desired if you had let us. Daddy knew what he was about. He made his fortune by seeing opportunities before any one else saw them, and yet, you were so afraid he'd lose what he had, you—killed him!"

Briggs eyes opened slightly and then contracted. He shifted them from the dauntless little figure and glared at Clifford. Then he looked back again and growled.

"If you ever want to see him again, get busy and quit trying to put the blame onto me."

"Yes, BB," she agreed, "Give me something to do!"

"Get Marks on the phone. Ask him to come down here. Phone Shaffer to roust out a crew for the shops. I'll build a special rocket and go up after him myself. Cut him out with a fusing rod and oxygen flame. Now get hold of yourself and help undo what you have done."

He turned on Clifford again. "You get out of here!"

Clifford stood his ground and stared at him, with a hard glaze upon his eyes.

"Are you going or shall I have you thrown in the hoosegow?"

Clifford boiled. How he wanted to paste Briggs one on his curling lips. But he knew that would not do. If Briggs had him arrested on any pretext whatever he would be unable to form any plan of rescue, so he walked away slowly, despising himself for being in a position that Briggs could bluff him.

Before he left the laboratory he heard the girl call for Marks. Briggs flooded the place with light as he reached the stairs and the buzz of machinery began vibrating over the room.

He left the dark house wondering why Briggs had gone to work so quickly to try effect a rescue. Did he have some sinister plan of his own in wanting to be the first to reach the ship?

Out into the street he found it swarming with people who rushed here and there and tossed every kind of a rumor about. He

lighted a cigarette and leaned heavily against the gate. With his mind busy with the stupendous problem confronting him he tried to devise some means of rescue as an hour passed and then another.

A dim star rose above the horizon and mounted swiftly toward the zenith, moving agianst a galaxy of ancient stars. The ship! The newest satellite of the universe! While he had been standing there he knew it had crossed the Atlantic, met the sun and the broad light of day over the cities and villages of Europe and Asia, crossed the day and night areas of the Pacific, the Western Coast of the United States, the Rockies, the Middle Western States, and was now racing toward the Atlantic coast again!

Speed! Could man never find its limit?

Forever and forever that ship would be on time, even when the earth had grown ancient and old and tottered in its orbit like a drunken top, it would race on and on. Earth folks hailed it now with the same joy they hailed every new discovery, but in a day or two the miracle would become commonplace, and men would think it undignified to pull back their heads to regard its meteorlike flight.

He knew he was fortunate. It was given to few men to both dream and accomplish. Yet the glory of his triumph was gone by the thought of Rothberg sealed inside the ship. As far as rescue was concerned he might just as well have been stranded on the moon.

Desperate Plans

CLIFFORD did not trust Briggs for an instant. If Rothberg went into that ship voluntarily why had he not first submitted the plan to his board of scientists? Or at least taken his daughter into his confidence before submitting himself wholly to Briggs' power.

With the vague idea of asking the girl to hinder rather than help Briggs with the rocket, he turned back to the house and found the front door partly open, as he had left it. It seemed that servants, and everyone else, were too upset to carry on the reg-

ular routine of life. He threaded his way through the dimly lighted hall and on back to the laboratory.

Briggs and Crystal were at a desk under an electric light. Before them were papers and blueprints. Briggs saw him and scowled. The girl did not look up until he stood beside them, then she said bravely. "BB's great. He has planned a vacuum tube rocket which shall be warmed chemically and supplied with oxygen from tanks!"

"How is he going to do any good sealed inside the tube?" Clifford asked.

"Meddling again," Briggs growled.

"Not meddling. I have a sincere interest in rescuing Rothberg, you know that."

"Oh, yes, I know that. You've been spending a lot of his jack of late."

"BB!" Crystal exclaimed, "I thought we were all to work together!"

Briggs put down some figures in a small cramped hand. Clifford watched him.

"What are you going to do when you get there?" Crystal asked Briggs.

"The devil!" he exploded, "One thing at a time. You two won't give me a chance to think." He let his pencil drop to the table. "If it will make you any easier, I'll tell you that the warm rocket is to be only a refuge. I go out for a few minutes and work swiftly and return when the cold becomes unbearable."

"You know you can't do that!" Clifford objected. "You know that scientists believe that space has a temperature of minus two hundred and seventy-three degrees Centigrade."

"Applesauce," Briggs growled. "Scientists now believe, at least some of them do, that space is not much colder than the arctic zone in wintertime, possibly not more than fifty degrees minus. I think they are right too!"

"Maybe," Clifford agreed, "but what will happen should you be wrong?"

He glanced at the girl for approval, but she frowned. Evidently she thought he was trying to discourage Briggs. Clifford did want to discourage him for he did not trust him at all, so he asked in spite of her distress: "Do you have any idea how cold

minus two hundred and seventy-three degrees is, Mrs. Briggs?"

"No," she said with despair in her eyes.

"Perhaps I can give you an idea. I saw a rubber ball dropped into a basin of liquid air once. You know liquid air is much warmer than absolute zero. When I recovered the rubber and dropped it, it shattered like rotten glass!"

"Then there is no hope?" she asked, her eyes begging for encouragement.

"There has to be," he said emphatically, "but to have hope one must be fortified against such temperatures, if one intends to leave the rocket."

"I'll manage that," Briggs growled.

"How?" Clifford insisted.

Briggs pushed back his sketches and glared.

"Didn't I tell you to keep out of this. Now, get this straight, we don't need your help!"

Clifford looked straight at Crystal expecting her to deny that Briggs was authorized to speak for her father, but she sat very silent and stared at the paper as though she wished he would go. Feeling uncomfortable he turned and left the laboratory, wondering whether she really wanted him to go or not. He was still determined to go ahead with plans of his own, regardless of whether they were appreciated or not.

HE took a taxi and sped to the University and called Professor Mullin from his class hall.

"Professor," he began before Mullin was within ten feet of him, "Did you know Rothberg is in that ship?"

"What? Not the satellite?"

"Yes and probably suffocating by now. I'll tell you how he got there later, but right now I want your help to get him out!"

"My! My!" the Professor ejaculated, "A very desperate situation."

He drew his head back and looked skyward as though looking for proof of that which he had heard.

"We haven't a minute to lose," Clifford continued.

"But we can't do anything at all," Mul-

lin exclaimed with widening eyes. "It will require years, maybe centuries of experiment to solve such a problem! Are you sure he is in the ship?"

"Not sure, professor, but I intend to go up and look it over."

"Go up? How?"

"The mail rockets!"

"But—"

"Yes, and that is why I need your help and that of the Board. We must construct a rocket at once, one with special features so that one may live to make the trip up and back."

"But, my boy, no one could take him out of the satellite. Open the port hole and the pressure of air inside would hurl him out to be frozen and lost in space! That chamber was sealed at sea level and contains a pressure of fifteen pounds to the square inch! More than a ton to the square foot! You'd never find his body afterwards, even with a telescope!"

"I know," Clifford answered calmly, "That is just what I have been worrying about. One can't go about rescue that way, and still Briggs is at work trying to do that very thing! I really believe he is trying to finish Rothberg to save his own hide."

"What are you talking about?" Professor Mullin asked puzzled. "Be plain and don't get excited. Let's go over there and sit down and you can tell me all you know."

"Very well," Clifford agreed. He knew there was no time to be lost if Rothberg was to be rescued alive, but he knew too that he must explain fully if he expected Mullin's help.

He followed the tall figure of the professor across to a stone bench and stood while Mullin seated himself. Then with one foot on the bench and his fingers working impatiently, he told him all that had happened the night before.

"So Briggs tried to gas you, eh? Well, well well. I'm really not surprised. A short-sighted man and a dangerous one. He loves money, but he shuts it up too tight to let it grow. I suspected he was anxious for Rothberg to die, but I never thought he'd murder him."

Mullin rose abruptly. "We must get

busy. Briggs is already hours ahead of us. Wait here a minute. I'll run back to the office and phone Marks and call the board together."

Clifford watched the tall, dignified man do his first sprint in years. He waited, his mind racing through calculations, devising and rejecting plans for the new rocket. When Professor Mullin came back, the talk with Marks and the other members of the board seemed to have influenced him a good deal.

"Marks has absolute faith in Briggs and his rocket," he said soberly, "And the Board has not only expressed faith in him but an admiration for his willingness to risk his life going up."

"I'd advise you to go over the thing with Crystal. She knows a good deal about Briggs and is rather keen on what her father might wish to be done?"

A little exasperated with Professor Mullin he left and went again to the Rothberg place, but she was not at home, at least to him. There were two strange guards at the gate who followed him to the street gate when he was refused admittance.

CHAPTER VI

An Urgent Message

BALKED, but still determined, he went back to town feeling that everyone was playing into Briggs' hands, even the girl. He really admired her loyalty to her husband, yet he knew that she was surely afraid of him and could hardly have confidence in him. That must she had plainly shown after the rescue from the vault. Then why was she putting her father's life into the man's keeping? Surely she must know that Briggs would never bring Rothberg back alive to incriminate him.

Puzzled by her actions and the problem of rescue, his brain went around and around in a perpetual circle of defeat. Yet he was by no means ready to give up. He tried to get help from the government, the state, the county, and finally from wealthy citizens.

The world's imagination was aroused as

It never had been before. Floyd Collins, penned beneath tons of rock and sand in a Kentucky cave had at one time set its sympathies afire, but Rothberg confined on an inaccessible vessel in plain sight of all, stirred sentiment as never before. There came flooding to the press little sketches of his benefactions and other eulogies from the men he had helped.

For the time, the space ship crowded all other items of news to the back pages. Scientists gave their opinion as to the possibility or impossibility of rescue. Thousands of letters and telegrams poured into the city to Briggs, to the Foundation, and to Clifford. Money was offered by popular subscription and private donation. Some of it finally came under Clifford's control, but by that time Briggs was three days ahead of him and Clifford knew that without some miracle he could never beat him.

Nevertheless he started furiously to work, hoping the miracle would happen. He secured the services of a munition works and laid out plans in accordance with the study he had given them. He also called to his aid every specialist in the field of rocket construction. His rocket promised to be something exceptionally good. And yet, with all its merit, he learned that Briggs was better equipped and making an equally good or superior rocket and would have it completed sometime the next day, whereas only the skeleton of his own was begun.

He met Marks downtown that afternoon. Marks barely spoke and passed on. Clifford whistled softly and went his way, but it was quite clear he didn't stand so well at the Rothberg place. "Well, he thought, "it is just as well that I don't. I've no business out there anyway."

He caught a bus and rode out to the munition factory intending to spend the night with his workers.

"How's it coming?" he asked the foreman as he entered.

"Pretty fast, Mr. Peterson. We're making real headway. Every man possible is at work and they are putting soul and muscle into every minute of it."

"Drive them, foreman," Clifford commanded, "Rothberg is suffering I am sure.

He may be dying and every second counts."

He did not tell the foreman he was running a race with Briggs; but walked down the rows of screaming lathes and whirling wheels.

"By the way," he heard above the roar and din.

He turned. The foreman had followed him.

"What is it?" he shouted.

"Mrs. Briggs called for you on the private phone."

"Mrs. Briggs?" Clifford exclaimed.

"Yes. She seemed pretty much upset when I told her you were not here."

Clifford stepped to a phone booth out of the clamor and called her. She answered his ring at once as though she had been waiting for him to call.

"Mr. Peterson," her voice came in a whisper, "Come out here quickly."

"What's wrong," he asked, sensing that she was quite alarmed.

"Don't ask. I can't tell you," she replied still in a whisper, "I believe someone is listening."

"Coming right out," Clifford assured her.

"Don't come to the house," she cautioned, "Meet me by the fountain in the sunken garden."

He hung up the receiver and opened the door of the booth, ran down the aisle and out the factory door.

Ten minutes later he crawled from the taxi and paid off the driver a block from the Rothberg place. Then he waited until the cab drove away before he hurried up the street and vaulted the low garden wall where the shadows of the maples were deepest. Crystal appeared from a clump of foliage as he reached the fountain. She hardly seemed the same woman he had left working with Briggs over the sketches of the rocket, that night in the laboratory.

"BB's mad," she whispered, "See—he's here in the garden now, waiting for the ship!"

CLIFFORD glanced through the foliage and saw Briggs' tall figure moving restlessly under the dim reflection of a light from the street. He paced up and down the

flagstone walk with his face turned toward the western horizon.

"Nothing strange about that," Clifford said depreciatingly. "He's not the only man in the world watching for that ship tonight. Maybe I'm mad also," he tried to laugh reassuringly.

"Listen," she insisted and caught his hand.

Briggs' hoarse voice came rumbling to them. He was quoting a verse, but not as one soothed by the cadence and rhythm of it, but rather as a man repeating a fearful curse:

"The moving finger writes; and having writ

Moves on, nor all your Piety nor Wit,
Shall lure it back to cancel half a line,
Nor all your tears wash out a word of it."

The starlike ship rose out of the west. Briggs shrank from it as from a blow. He turned his back upon it but looked over his shoulder as though he could not take his eyes away from it.

"God," he rumbled on in that hoarse deep bass, "God, I've got to!"

The luminous patch grew larger and larger against the sky.

"What do you make of it?" she asked, "He's been going on like that for two nights now. I can't stand it any longer!"

"Insane," Clifford announced slowly. It was the most charitable thing to say and the easiest way out for her when the truth became known.

"I know it," she whispered, "That is why I must carry on."

Briggs came up the path. She shrank into the shadows, but Clifford stood his ground.

She plucked at his sleeve.

"Hide please, for my sake," she whispered tensely.

He stood undecided.

"Hide—please," she begged, "It won't do for him to see you here with me."

Clifford shrugged his shoulders in acquiescence and disappeared into the leaves.

Briggs came down the path and she stepped out to meet him. He stopped and looked down at her, his shadow outlined against a street lamp. The glow of the

light put a halo into her yellow hair and etched the cameolike outline of her profile with its radiance.

For a minute Clifford feared for what Briggs might do, for it was plain he was all wrought up and unbalanced. He could see Crystal's eyes widening as Briggs stared into them and despite her plea he was about to step out to let Briggs know she was not alone, when Briggs dropped his gaze to the fountain and said hoarsely:

"God, I love you. That was why I—no, I'll forget that now."

"What do you mean, BB?" she asked excitedly.

He stood beside her as though debating something within himself, then he turned abruptly and said: "No, I don't want to talk to you about it. I want you to think well of me, Crystal."

He smoked fretfully and seemed unusually restless as though something weighty was on his mind. After a moment of that kind of tense silence he began to pace back and forth across the cement flanking of the fountain. Then he faced her, turned about again and walked away.

Clifford came from his hiding feeling somewhat ashamed.

"Clifford," she said impulsively, "I feel despicable to say a thing like this about my husband, but I have a duty to my father also. That is why I called and asked you to come here. I don't believe BB intends to make the flight at all. I believe he is afraid."

"What did you want with me?" he asked though he knew very well what was coming.

"I don't want him to go. I never did from the very first, but I pretended to trust him so that he would complete the rocket. BB's gruesome, insanely cruel, sometimes, but there is no questioning his ability as an inventor. We needed him to perfect the rocket, thinking his own life would pay for any mistake he made."

She laid her hand on his shoulder, "I know it's a good deal like asking your life, but will you go up?"

"Yes," he answered his heart leaping, and added softly, "For him and you."

The Struggle for the Rocket

HE took her hand from him and drew back as though she was suddenly afraid, and said hurriedly:

"Come at daybreak. I'll let you in at the back gate. You will be off before he knows it. I will hinder him in some way."

She left him and ran swiftly up the path.

Clifford remained rigidly where she had left him until he saw the light of the porch flash upon her white dress as she opened the front door and entered the house. The door closed quietly behind her. He waited wondering just what to do. He was worried for what might happen with her alone in that house with Briggs, and still he felt he ought to get away from the garden and come back as she had asked. Undecided he waited on, listening for a cry, fearing she might be in peril, hoping that Briggs would come out so that he could feel easier about her.

A distant motor truck growled as it labored up Blackstone hill, a flash of headlights swept this way and that as a belated auto sped along the drive; the low blast of a tug-boat moaned as it moved up harbor; fretful broken noises of the city's sleep.

Then there was a sleep stir throughout the city, blatant honking of autos on the still night, greeting again the rising of the earth's newest satellite.

The city quieted again and Clifford sank upon a stone bench. The night was warm, the air calm. He had not slept for three nights and yet he was not at all drowsy. Briggs was on his mind. He knew the man had daring and nerve, then how could Crystal be right about him being afraid? It was a fearful thing to leave the earth which confined all men, and risk the unknown of the cosmos.

He half expected to see Briggs come slinking from the house to watch the ship again as it mounted the sky; to hear him repeat again the lines he had turned into a curse; to see him turn his back and look over his shoulder as though the ship was a magnet his eyes could not shake off.

And when Briggs did not come, he felt even more uneasy about the girl. It was

certain she was afraid and only a sense of loyalty to an unfortunate husband kept her within him. Twice Clifford started to the house, twice he returned, and finally the time came for him to meet her. He circled a private hedge and reached the rear gate. She was there waiting and put a finger to her lips as a signal for silence.

Unexpectedly the gate to the rocket yard opened and Briggs stood as glowering as a thunder cloud.

"What are you doing her at this hour?" he growled.

Clifford pushed his bulk through the gate into the rocket yard. "I'm going to use your rocket, Briggs."

"You are going to get out of here or be carried out feet first!" Briggs roared.

Clifford glanced around the yard. The rocket angled its long gray nose toward the sky, which was just becoming flushed with the pink of dawn. It was indeed a beautiful machine, stream-lined and fully equipped. There were searchlights, mirrors for observation, crawlers to take her about over the hull of the satellite, oxygen tanks, and every other contrivance imaginable to assure safety and comfort. Of course, first glance did not reveal all that, much of it he discovered a few minutes later. But a glance did reveal that Briggs had made a perfect passenger rocket.

The door of the rocket chamber was ajar, whether Briggs had just left it, or it was open accidentally, he did not know. The switch which would fire the rocket at the next passage of the ship was also open.

Clifford glanced at his watch. Only three minutes to wait!

He shot a right uppercut into Briggs' jaw and behind that swing he put the hard hitting vim of his hundred and seventy-five pounds. It took Briggs by complete surprise and sent him crashing at the gravel.

Clifford hurdled across the yard and closed the contact switch, then climbed into the rocket chamber and whirled down the levers which closed the door.

He glanced again at his watch as Briggs got to his feet. A full minute before contact. Briggs shook back his disordered hair and looked groggily around. He ap-

parently noticed the closed rocket switch and ran for it, but Crystal threw herself upon him and circled his waist with her arms.

CLIFFORD knew that contact was at hand and tightened down the levers. It was a fifty-fifty chance whether Briggs would make the switch before the ship passed and the rocket was automatically fired.

Briggs came on dragging the girl, but badly hampered. Briggs turned on her and struck her in the face. Time was up. Clifford's blood boiled but he couldn't leave then, not even to help the girl. Contact was at hand. He got one more glimpse of Briggs. A short, bullnose pistol was in his hand and though Clifford heard no report inside that tight tube, he did see a whiff of thin blue smoke and noticed the revolver was not aimed at him nor the girl, but at the chronometer which closed the contact, and that was all he saw for he was catapulted upward toward the sky.

"Too late, you fool," Clifford thought as he felt the rocket rising with increasing speed, vaulting him up, up, up, out of the garden, out of the world, leaving the earth shrinking like a dwindling landscape far, far below.

Launched into strange and unknown dangers, he had no thought of them, but was wondering about the two he had left so far below in the rocket yard.

Five minutes passed. He waited anxiously for the banging contact with the steel hull of the satellite. Ten minutes passed and nothing at all, not the slightest noise.

Impossible! What had happened? Had he actually touched the vessel and there been no noise due to vacuum of space? He knew there could be no noise outside the tube for there was no air to carry sound, but inside the air should have carried it to him.

Another minute went by. He looked out the port hole again and again. He could see nothing. Had Briggs overheard his talk with the girl and changed the chronometer to send him out before the ship passed? Was he lost in the infinite stretches of space?

The observing mirrors were folded back into the niches of the rocket hull to protect them from the burning air on the trip up. He knew that he was then far above the friction of air and he decided to use them to try get a glimpse of the earth. He worked them out and found there was no friction against them at all. He did not even seem to be moving. He felt as though he were suspended in space without motion or direction. He felt as fixed as though he were anchored to the solid earth, and yet he knew he could have hardly lost the furious velocity he had gained.

His mirrors caught the earth, far below. He must have already have travelled around it for a long ways, for the landscape seemed whirling backward dizzily as though he looked down from the window of a speeding plane. Twirling his mirrors about for new angles, he realized that he was caught in an orbit all his own and was one of the two earth beings out in space beyond human help. The great gulf of space spread about him and the tawny world below seemed exotic and bare, swept now and then by a curtain of cloud bank and again caught in the shining splendor of the blazing sun.

With a feeling of resignation he turned his mirrors hopelessly. He caught something else in the glass! The space ship! Briggs could not have changed the chronometer after all! Why the sixteenth of a second would account for that quarter of a mile miss. It must have been that shot Briggs gave the chronometer which had done the trick. The bullet must have closed the contact just the fraction before the ship was due, for he was ahead of the ship!

He gazed pop-eyed at the long gray thing, seemingly at rest with its head pointed toward him. It was only a quarter of a mile away, and yet it might as well have been a thousand miles.

He wondered if he could devise some way to slow up so that the ship might overtake him, but he knew that in space nothing would offer the least brake to his speed. The mirror caught the blazing sun against a black sky totally devoid of stars. A mystic, unreal sun, a weird uncanny sky, and

he was alone with only a thermos bottle of coffee!

CHAPTER VII

Still Alive!

WHAT could he do? Absolutely nothing. His problem as great as that of rescuing Rothberg. He thought of releasing part of the gases in the head of the rocket and taking the risk of them projecting him back to earth, but that would be too cowardly. How could he face Crystal after his failure?

Then he found a new puzzle. Why was the sun in the glass? Was he falling? Something certainly had happened to alter his course.

He looked for the satellite, but it was nowhere to be seen. That was queer! He had not changed the levers which moved the mirrors. He worked the mirror about and again caught a view of the ship. He drew his free hand across his forehead. Was he going daft? Was there some fluid in those upper regions to which steel was permeable and which had affected his brain so that he was seeing things? The magnets in the nose of the rocket were full on, and yet the heavy steel base was pointing toward the satellite. Not only that but the ship was between him and the earth! No—it was coming up, moving around him in a circle, and the butt of the rocket followed it like a compass needle!

The ship rose and eclipsed the sun. Then it occurred to him that the truth was the satellite was still and the rocket was circling it, for he remembered that there would be an attraction between two bodies moving freely in space, and that the smaller body would form a satellite of the larger. And yet, those strong magnets in the head of the rocket did not seem to take hold of the ship at the distance of a quarter of a mile, although they were the most powerful magnets that had ever been made.

Around and around the ship he went like the little rubber ball he had swung around his head that night at the board meeting—like one of the carriages of an invisible ferris wheel with its hub at the ship. He felt

as though he were floating in oceans of air. What little gravity he felt was directed toward the steel mass at the base of his tube and not toward the earth at all!

But he had little time to wonder at the new laws which had control of him. He was in the most desperate situation imaginable; one that was entirely foreign to human experience and he would have to do some bold, pioneer thinking if he were to extricate himself.

Gazing out the window of his little room he decided to take a long chance, really the only one possible. He pulled the switch which discharged the gases in the head of his rocket. The butt of the rocket pointed directly toward the ship, and Clifford knew a little gas might do no good at all, and too might send him ricocheting far beyond the pull of the ship and make his position even worse—if such a thing were possible. In truth though he did not expect anything to happen at all.

He released a fraction of the gas in the nose of the rocket. To his surprise he went winging across the quarter of a mile and he cut his gas immediately. Before he hardly knew what happened, his rocket swapped ends, the magnets caught the pull of the steel ship and with a resounding jar he made contact head on as neatly as he could have wished.

Even in his joy at having retrieved himself from a hopeless situation he thought with a great deal of interest of the mechanism of the rocket that permitted it to move through the vacuity of space. Surely there was no atmosphere where he was, for the friction of it would have started him in a spiral descent toward the earth. Then what law caused the change of velocity and enabled him to make contact?

He pondered over the thing as he moved his crawlers this way and that, working back and forth over the huge hull, in his search for the porthole.

DEEPLY engrossed with this problem, for the scientific trend of his nature was always alert, one of his mirrors discovered the porthole and he worked his rocket over near it.

The glass was opaque with frost which had gathered inside the ship. He extended one of the mirrors so that it tapped on the glass. He waited and tapped again.

Was Rothberg dead? Was he all alone beyond the barriers which divided life to earth?

Sad and discouraged he waited and tapped again. Then he gasped with joy. Something was rubbing away at the frost on the glass! Rothberg must be alive!

He watched breathlessly as a place was cleaned and the drawn face of the old man pressed against the glass. There seemed to be a hopeless bravery in the haggard features as the gray old eyes searched about to seek the cause of that noise out in the cosmos. Rothberg's eyes opened with a start. Hope leaped into them. Every feature portrayed the fight for control he made as he took in the rocket and then Clifford himself.

Before Clifford could send any kind of a signal Rothberg left the porthole and soon he returned with an empty pitcher which he turned upside down and motioned to his throat indicating it was choked and dry. Clifford noticed that he was gasping. The ship was big and had contained a good many cubic feet of air, but it was plain that Rothberg now had little of it left to breathe. Briggs most certainly had lied about his invention to rinse carbon from respired air. Rothberg must have help soon or there would be no need of it at all.

Even as Rothberg stared at him hope seemed to fade from the kindly old face. He was no mean scientist and certainly knew what insurmountable difficulties to his rescue. Clifford motioned that he must return better equipped before he could hope to do anything.

The old eyes smiled encouragement but the chin sagged a little and then drew up tight and firm. Plainly Rothberg believed he would never come out alive. Yet, what could Clifford do to encourage him? The immutable laws which confined life to the earth were all against him. Try as he would he could think of no plan to enter the ship without exposing both of them to certain death.

He glanced at his chronometer. The loss in not making direct contact had eaten heavily into his time and he was nearly back around the earth again. Time to kick off was at hand. He indicated with motions that he would soon be back, and Rothberg took his finger and wrote on a portion of the frosted glass:

"Tell Crystal BB——"

The sentence was but started. Whatever he wrote or intended to write, Clifford could not know, for contact came and the gases discharged. He was shot away. In a few seconds he found himself floating downward as the blades of his helicopter caught the rare upper air and began to race furiously above the tube.

He had been but a few seconds going up. It took him an hour to come down. Telescopes on the earth's surface must have picked up his descent, for there were ten thousand people gathered around the farmstead near the outskirts of town, when he landed. He opened the door and staggered out of the rocket. Then thousand voices and auto horns drove him deaf with their raucous noise.

The Solution At Last!

HE paid no attention to the insistent reporters who trailed him. All he wanted was a phone to find out what had happened in the rocket yard after he had left. Among all that sea of faces about him was none he felt he could ask such a personal question. He hailed a car and the man inside seemed glad to be of service. Clifford asked to be driven at once to the munition works which was only a mile away. They went into seventy by the time they were on the highway.

At the works he got hold of Crystal and was much relieved when she answered the phone.

"Mrs. Briggs," he said and found it hard to get used to the fact that she was BB's wife, "I have good news for you."

"Tell me," she begged, "Is he alive?"

"Yes, he is alive, but his condition is desperate. Your—I mean there were no provisions made for oxygen or water. I don't know about food."

"Could you speak with him at all?"

"No, but I saw him plainly at the port hole. He seemed brave but rather discouraged. I don't think he has much hope."

"Have you," she begged, "Did you find anything to give hope?"

"Not up there," he replied and wondered whether he should tell her the truth, "There is no way I can think of to transfer him to a rocket while the ship is aloft. We must bring her down."

"But you said it couldn't be brought down! That it was like death! You told BB that and it's true!"

"Listen a minute," he insisted, "I forgot one thing when I told Briggs that."

"What?" she cried eagerly.

"That the ship was of steel. We'll have to build magnets."

"Magnets?"

"Yes, powerful enough to hinder the ship at every revolution so that its speed may be checked enough to bring it under the influence of the earth's gravity."

"But that would crush him!"

"No, get hold of Blair and the rest of the Board. It will take close calculations, but the ship can be brought down in a spiral which will increase as it meets the friction of heavier and heavier layers of air. Blair can calculate where to place our magnets so as to let her drop in the sea outside the harbor. She is hollow and will rise and we can get him out."

"Oh God!" she said earnestly, "I hope you are right."

He hung up and went back to the plant.

In an hour Gertz, Played, Ralls, and Blair were there and a few minutes later Crystal and Briggs came into the dingy room used as an office.

Briggs regarded Clifford with the eyes of a wary cat. There was a hint of suppressed ferocity in his manner, and an excited curiosity in his gaze, but he did not ask how Clifford had fared aloft nor what he had learned. In fact he tried to act as though nothing had happened that morning in the rocket yard. Clifford after a look of appraisal gave him no more attention and went over to the group of scientists who had al-

ready gathered. Crystal followed him and Briggs remained near the door.

He explained in a few words how he had started work on the largest electro-magnets ever constructed and how he hoped to hamper the speed of the satellite until it would respond to the earth's gravitational influence. He asked Blair to calculate where the magnets would have to be mounted to bring down the ship just off shore in the Atlantic, and asked Gertz to calculate the power necessary to influence the ship.

Gertz listened until Clifford had finished and then he shook his warty little head. Ralls echoed that shake by a baffled expression on his lean features.

"Your theory will not work out," Gertz whispered to him so that the girl could not hear.

"Why?" Clifford asked alarmed.

ERTZ lowered one eyelid as though trying to penetrate a deep distance, "I believe you had a fair example of how short a distance the magnetic field will affect in the way your magnets acted in the rocket as you circled the ship. Two hundred miles is entirely too far for the last hope that the use of electro-magnets will bring down the ship."

Clifford dared not look at Crystal. He knew the expression on his face would betray him. But he did not look at Briggs who had pushed into the group to catch what Gertz was saying. Briggs' face was an impersonal mask. If he felt any emotion he did not show it by the slightest change of expression.

"Has anything gone wrong?" Crystal asked as silence seemed to smother the little group.

Clifford ran his fingers through his short cropped hair and made no reply.

To cover their gloom the scientists discussed electro-magnetism with an air of abstraction which revealed that their minds were on something else.

"What has gone wrong?" Crystal asked again.

"Nothing! Nothing at all!" Clifford shouted nervously above the low buzz of voices.

Every man in the room turned upon him as though they thought his worry had suddenly turned him daft.

"I've got it!" he shouted again and waived a doubled fist. "Listen you men. Find some flaw in this if you can! Rockets are the solution after all! We have dozens of them ready at the laboratory. Fill them with bar magnets to increase their weight and hold on the ship. Fire enough of them to hamper her and bring her down in a spiral until she hits the sea!"

"You've got it!" Gertz beamed, pounding his fist on his knee. "Fire them with no more velocity than just to make contact? They will drag her down. The problem of how many is for Professor Blair!"

Clifford's eyes were glowing as he looked at the girl and then for Briggs, but Briggs had disappeared. Not that anyone cared. BB had been useful in completing the rockets, but now nothing more complicated than bar magnets were needed to do the work.

Daybreak came again and Clifford stood beside the girl as the rockets shrieked upward to meet the ship. They watch through telescopes which had been mounted in the yard.

Clifford turned to the foremen and demanded:

"There are eleven of them. Blair said there should only be ten! Great God you will drown him sure!"

"We fired only ten," the foreman declared stubbornly. "Didn't I count them myself. Every man working counted them. There were only ten."

Clifford drew his lips thin and wondered if he had miscounted. The ship was then past the vision of his telescope and too far away to recount. But one thing was certain, she was coming down swiftly. The halt in her flight and the curvature of her orbit were apparent even though Blair had figured it would take three revolutions to bring it down and it would fall faster when it encountered denser air.

Though six hours remained before they expected the ship to fall, there was an immediate surge for the shore-line. Thousands of autos crammed each other and honked for room. They crowded each other

er and edged for positions as close as possible to the point Professor Blair had picked for the landing.

That extra rocket troubled Clifford no little, though he said no more about it. He got Crystal and a number of close friends aboard a small cutter and pushed off to avoid the mob ashore. Briggs could not be found. Crystal seemed worried but the intense suspense as to the fate of her father must have kept her mind off him to some extent, for she did not mention him in all the six hours she waited—watching the passing of the steel satellite in its narrowing orbit.

Noon came. The summer sun blazed down upon the swelling waves as they came sweeping in from the limitless sea. Thousands upon thousands of people who jammed the shore had been waiting since early morning.

CHAPTER VIII

A Rescue and a Tragedy

THEY milled about raising a ceaseless dust which settled slowly in the calm suffocating heat, and still they held tenaciously to their places near the shore.

Little boats and large ones ploughed here and there seeking a point of vantage back of the long watery lane governed by government cutters.

Someone shouted: "There it comes!"

The shout was taken up and tossed from man to man. Heads craned and all eyes strained toward the east. The wave of humanity on shore surged forward. There were cries, the shouting of officers and shouting of the eager, curious mass they sought to hold in check. Ten thousand hands shaded ten thousand upturned eyes from the glare of the high noonday sun.

A huge monoplane swept in from the sea bringing passengers from down coast to witness the most marvelous landing in the history of men. And when the mob saw the new comer was no more than a huge plane, it wailed in disappointment; but did not retreat in the slightest.

Minutes passed. The sultry heat seemed almost unbearable. The rails of the cutter

were like furnace rods fresh from the fire. Clifford shielded Crystal with her lavender parasol, taking the sun himself.

And then from out the horizon sped a long gray shape, silent as an oncoming hawk. It was not riding high as had been expected, but hugging the sea. Even as they watched it spanked the water and sent a long silver veil of spray sparkling into the sun.

Crystal caught her hands together and stood petrified unable to bring her glasses to her eyes for a better view. Clifford felt a thrill not wholly accounted for by the success of the rescue. Something historic was taking place, something which held a marvelous prophecy—that some day this miracle should become an hourly occurrence and earth folks would ride in from the cosmos to land with exactness at every port of the world.

The ship came speeding on, skipping upon the water, like a flat rock tossed across the surface of a pond. She dove and Stortz groaned and leaned far over the rail. She rose, her wet steel glistening in the sunlight and still Crystal made not the slightest move.

A mile away Clifford saw that something was riding her back. He brought his forgotten glasses to his eyes. It was a rocket! One that seemed strangely familiar even at that distance. It looked like the one that Briggs had made for the rescue flight. There were eleven after all! Briggs must have fired the other one in hopes of sinking the ship.

"Good God!" Clifford breathed and the girl turned about and found her voice at last.

"Is he dead?" she screamed, "Is he dead?"

Clifford shook his head, but his heart sank for he felt that it would be only a question of minutes now. That eleventh rocket was dragging down the ship. It was diving again! Plowing deep and then wallowing back to the surface like a wounded sea beast.

Clifford turned to the captain of the cutter. "Have you a rifle on board?"

"Why, yes," the captain answered plainly puzzled.

"Have one brought to me at once, sir. It may save the satellite."

The Captain barked an order. Clifford looked again at the satellite wallowing along, half under water.

"Get to as quick as you can, Captain," he begged.

The Captain shouted an order and the cutter got under way.

The satellite was still moving swiftly, but losing its speed like a passenger train drawing into a station. Someone handed Clifford a rifle. He took it and did not look around, his eyes still upon the satellite.

"What are you going to do?" Crystal cried.

"Briggs' bullet set off the rocket in the yard. I am hoping mine will shake her loose from the ship."

With a scream of discharging gases, the rocket soared away with such rapidity the eye could hardly follow its long gray shape into the air. But Clifford was not trying to watch its meteorlike flight. He was looking at the satellite. The shock had sent her under again, but before she was swallowed by the sea something long and rigid toppled from the soaring rocket and struck the glistening hull. A man had fallen stiffly from the rocket and as he struck the hull he shattered into a thousand flying ruby crystals which sparkled in the sun. Frozen in the absolute cold of space he had shattered like rotten glass. Clifford thought of the little rubber ball he had dropped into the container of liquid air.

"It's BB!" the girl screamed and covered her eyes with her hands.

Clifford caught her and looked down at the undulating surface of the glittering sea. The satellite was nowhere to be seen.

For a moment not a sound came from sea or deck, except the lapping of waves and the throb of engines. Clifford still held Crystal and felt her shaken with despair. He did not know how to comfort her. All that he could do was to stand stiffly and think.

Suddenly he heard another bark of orders. A running of hurried feet across deck. The confused shouting and reshouting of orders.

Boats were being lowered! Why?

He looked again down at the sea and saw a feeble churning of the water near the place where the satellite had gone down. A head came above the waves and then sank from sight.

Rothberg! He must have broken the porthole glass and come up as the ship sank.

A week later Rothberg was about again. He beamed at Clifford as he came into the room. Crystal was standing beside his chair watching Clifford with a new admiration in her eyes.

"There is one thing that puzzles me," Clifford said, "And that is what killed Briggs? What was he doing up there anyway?"

Rothberg's mouth drew firm and Crystal looked at the pattern of a rich rug which was spread across the floor.

"The answer is very simple," Rothberg answered after a pause. "I saw him make contact and watched him through the porthole. He opened the door of the rocket and it seemed his chest literally blew open like

a rotten tire under too much pressure. He had a sledge hammer in his hand and I took it he planned to break the porthole glass. No doubt he would have succeeded but he overlooked the fact that the pressure of air inside his lungs was fifteen pounds to the square inch. He had on some kind of a jacket to protect him from the cold, but the explosion blew it wide open."

Rothberg shook his shoulders as though ridding himself of what had occurred up there, then he said confidently:

"We're going it for satellites right this time, my boy. Fit them for passengers as well as mail. It's a big thing that we have circled the earth in two hours, but eventually we may run an air line between here and Venus. You know the main problem of interplanetary flight has been that of landing the ship, and now we have solved that!"

He put his large veined hands upon the girl. "Crystal, little soldier, get out and let us get to work."

She turned and left them reluctantly. Clifford watched her until she reached the door. She turned and though neither said a word, a glance between them held a promise that all would turn out right.

THE END

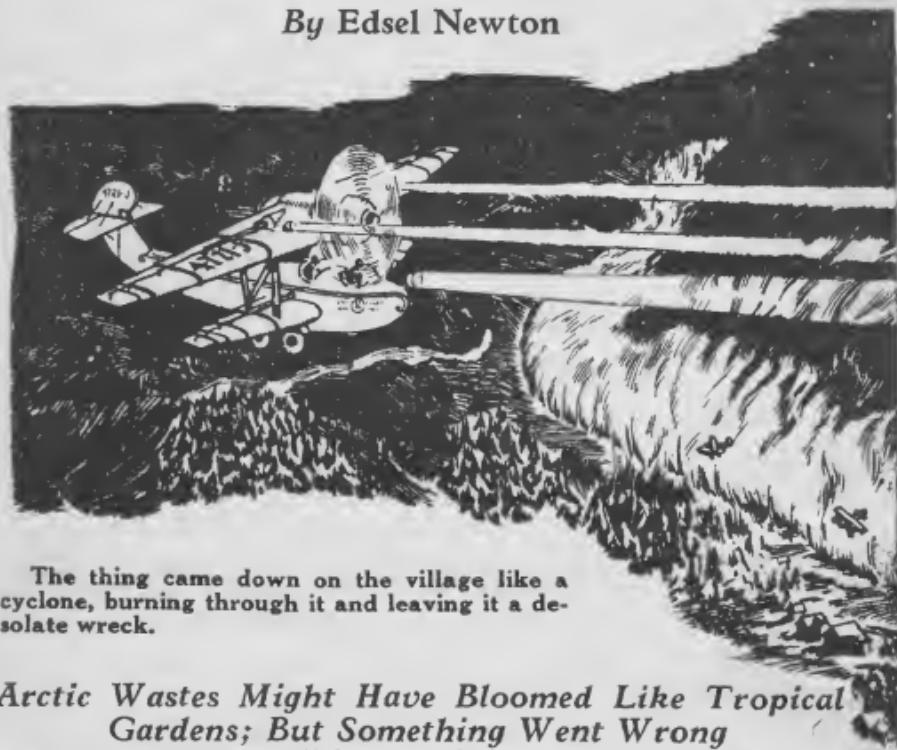
What Is Your Knowledge Of Science?

Test Yourself By This Questionnaire

1. What velocity does the earth have in its orbit? What velocity must a body have to escape from the sun, at the distance of the earth? (Page 777)
2. What speed of ejected gases did Dr. Goddard get in his rocket experiments? (Page 778)
3. What is the atomic weight of iron? (Page 822)
4. What is the name given to the ends of our nerves? To what may our nervous system be likened? Why? (Page 849)
5. What is the chemical composition of quartz? (Page 859)
6. What are the conditions necessary for life similar to ours on any planet? (Page 863)
7. What advantages does the moon possess over the earth for astronomical observations? (Page 864)
8. In what part of the solar system is Ganymede? What are some of its characteristics? (Page 867)
9. What are the most important of the endocrine glands? What are their functions? (Page 837)
10. Where is the pituitary gland located? (Page 838)

The Flaming Cloud

By Edsel Newton



The thing came down on the village like a cyclone, burning through it and leaving it a desolate wreck.

Arctic Wastes Might Have Bloomed Like Tropical Gardens; But Something Went Wrong and Disaster Followed!

CHAPTER I.

I HEARD about it from one and another of a mystified populace; the radio bulletins had called it the "Uncontrollable Destroyer", newspapers had referred to it as a natural phenomenon and had created an alarm, it seemed, over nothing. It turned out to be one of the most astounding things that even this modern world of 1975 had been privileged to see.

The people were filled with both awe and terror long before I knew of the existence of the so-called "Hot Spot", the chemical phenomenon that appeared over the North Pacific and startled airmen and operators of aircraft throughout the world.

Having gleaned from news bulletins noth-

ing more than the fact of its existence—after discrediting the usual traditional newspaper tales—I was determined, as an aeronautical engineer, to learn more about it.

I was seated in the lounging room of the Cosmopolitan Club at the Grand Central Air Terminal in Los Angeles when Joe Blaine set down from a freight hop to Vladivostok. The minute I saw his great sesquiamphibian trundle up to the loading dock I knew she had weathered an unusual storm. Her great wings were all but limp, and one of the tips of the upper surface had been torn away as neatly as if it had been cut with a huge pair of scissors. Her motors died quickly, as if the mechanics were in great haste to stop their vacuum-cleaner-like



whirr. She sat there in silence for but a moment, and then the door of the control room opened and Joe Blaine's first mechanic came down, followed by his assistant.

They were greeted by an anxious dispatcher who waited there at the ladder until Captain Blaine emerged from the control room, and I joined them there, wondering what could have taken place. Blaine, stolid, immaculate and young, came down to gaze steadily at that torn wing for a moment before turning to us and heaving a long drawn out sigh.

"Such heat I have never seen," he said to the dispatcher, after having nodded to us a hurried greeting. "The telephones went

out the minute I got your orders to swing north, and that was all that saved me. That was six hours ago. Had I waited to change my course I would have flown directly into the path of the thing. It was a phenomenon beyond my comprehension—a ray of light that boiled the ocean below us; and when I turned and flew away from it the plane was lifted several thousand feet in the heavy updraft that came from that furnace-like spot on the surface of the sea. We did not find clearance for five miles north of there. Look at the plane—you know the rest!"

G ASTRO, the dispatcher, as well as the rest of us, were astounded. We search-

ed each other's faces for an answer to this strange mystery, but no manner of speculation would solve it. We went into the office where Captain Blaine sat down to write out his report, all the time being interrupted by Gastro.

"But there wasn't any report on it from the weather bureau," objected the dispatcher. "If it is a sunspot—"

"Sunspot! Ridiculous!" Captain Blaine looked up from his reports. "Do you think a sunspot would affect an area of only five miles square? Do you think a sunspot would melt off the end of one wing of my plane—a few feet at the tip—and boil the water of the sea? I feel fortunate, Gastro, to have flown out of it in the face of such terrific heat. Look at the sides of my plane. The varnish is melted away. Why, even the wing covering is shriveled!"

While I waited anxiously for the captain to finish his reports, Gastro stepped from the room into the offices of the weather bureau. He returned, presently, to shake his head doubtfully and pace the floor.

"Hang it all, Blaine, can't you tell me something more about this hot spot? Wasn't there anything above or below it that might have caused the trouble? Can't you give me a faint idea of what caused it? The officials of the company are too much disturbed about this for a mere report."

"I'd be glad to tell the board of directors what I have told you. If in my haste I

have neglected to mention something, I am sorry; but it is just as I told you: I was flying three hundred miles per hour at ten thousand feet when I saw a shimmer on the ocean and felt a draught of hot air through the ventilator. As the heat increased I called you to report it, and before we could finish our conversation the radiophone went out. I swung to the north, and barely escaped complete destruction."

"How do you know it was five miles across it?"

"I only approximated it by the distance I flew to get around it. It may have traveled north as I did."

* * *

That was all I learned of the "Uncontrollable Destroyer" that day. The radio bulletin carried the news to the world, and astronomers and meteorologists throughout the globe speculated upon the possibilities of this strange phenomenon.

Passenger traffic had long ago ceased to travel the great circle route to Siberia. But the freight planes had found better flying conditions up there. Dozens of great planes flew through this area weekly. Not one of those that came in a few hours either before or after Captain Blaine

ONE of the greatest sources of misfortune to the race is the fact that so many million square miles of the earth's surface must remain desolate arctic wastes, while the habitable portions of the globe are over-crowded. Many scientists have spent a good deal of time and energy in the attempt to find a means to transform what is now barren into a place fit for human use. One such scheme for example would divert the Gulf Stream from its course across the Atlantic in order that it shall warm our north Atlantic seaboard. There is no doubt that any scheme that could make Alaska, the arctics, northern Canada, Greenland, etc., places of moderate climate, would be of the greatest benefit to the human race. But such a gigantic plan could not succeed before many disheartening and often tragic experiments were made. We can thus sympathize with our poor professor in this original and exciting story, for we know that his motives were of the best.

had seen any indication of what had been reported by this young airman and his crew. But it was assumed at the meeting of the board of directors, where Captain Blaine told his story, that hardly any two planes that flew out to Vladivostok over this route would strike exactly the same

latitude. This was a point in Captain Blaine's favor, for he was known among his fellow flyers and the directors of several air lines as having always cut down the regular schedule by hours, wherever he flew.

THE investigation consumed but half an hour, but two more hours were spent in speculation. As the aeronautical expert of the company, I was of course invited to attend. It was when President Fred Brettner, the young and adventurous airman who had become an official of the company, arose to speak in the midst of rampant discussion that all eyes were turned to him. As always, in the face of sudden and unexplained danger, men's fears were overcoming their judgment and it was evident that effective leadership and determined action was necessary. Unless that action came, the meeting would degenerate into the heated squabbles of panic-stricken and fear dazed men. Brettner spoke quietly.

"Joe Blaine and I are going to retrace his course in a fast plane this afternoon," he announced.

"We won't have it!" said the chairman. "We cannot afford to take chances on losing you. Let me suggest that you send an engineer, a man who is familiar with geology, astronomy and meteorology. I think Thomason will be the man."

My heart leaped to my throat. Blaine turned to me and smiled as if pleased with the suggestion. Several members of the board nodded. I arose to thank them. Two hours later we were making preparations to fly back over the North Pacific and into the territory that had already become known to airmen as the "Hot Spot", and to the news bulletins as the "Uncontrollable Destroyer". Some poetic intuition must have given the

phenomenon that name, for it seemed to have certainly justified it even before a day had passed.

CHAPTER II

The "Hot Spot"

OUR plane was the latest thing in speedy aircraft. From her great Rickman-Conroff motor to her telescopic wings she was an innovation. It might be mentioned here that her wings were, as the name implies, capable of being "taken in" after the ship left the ground, thus decreasing resistance as the motor "revved up" and she straightened out. We needed all her wing surface to lift the heavily loaded little ship off the ground, but once in the air the powerful motor pulled her along with such force that only half her maximum wing surface was needed.

The work of telescoping the wing was done with a tiny crank in the control cabin. That accomplished, the plane shot forward with the speed of a bullet. Within six hours we had covered the distance to where Captain Blaine had last seen the "Hot Spot".

At first we found no trace of the phenomenon.

We flew for hours through all kinds of weather, from rain and wind to heavy snow and sleet. And all that time I was trying to arrive at some conclusion as to the cause of this supposed ray of heat, wondering if it were the work of experimenters, or a natural result of changes in the atmosphere, or if it was a distorted sun ray.

Once we lifted through a maze of clouds to look down upon a storm-torn strip of land that we found to be one of the Aleutian Island chain. It was then that we decided to turn to the northeast and fly slowly to the coast of Alaska. Thus Captain Blaine extended the wing surface of the



EDSEL NEWTON

plane and cut the motor down to a few revolutions below cruising speed. We settled back in comfort to study the skyline. The sun was setting.

Blaine turned to me and said, "We'll never find it today—it follows the sun. I'm sure it's a ray, otherwise it would have remained somewhere near the latitude in which I first saw it."

I was still speculating as to this possibility, and hardly answered him. We were running down the Aleutians and an interesting stretch of islands lay before and beneath us. Then I saw something off to the left that froze my eyes to the spot. Just where the water met the land there was a stretch of burned-over ground across a tiny peninsula. It ended in the water again, and began on the other side—just a burned path that extended farther and was lost in the distance. I pointed it out to Captain Blaine.

Calm and cool, he did not speak, but immediately kicked in the throttle, took in some of the wing surface, and banked over until the nose of the plane was pointed at the spot. We came down upon it within a few seconds and were following it out into the northern wastes when I saw something else that immediately caught and held my attention. Ahead of us, and just over the end of the wide path of fire and destruction, was a bright ray of light that seemed to extend up into the heavens until its source was lost. And where it moved comparatively slowly toward the east it left on the ocean a trail of boiling water and on land a wake of charred surface. It seemed moving in the direction of Nome.

WE were horrified, and yet we knew that immediate action was necessary. The heat left the air bumpy and rough, and the plane was unsteady and hard to handle. Captain Blaine was fighting the controls as if he were steering an ocean liner in a hurricane. We were soon wiping perspiration from our brow.

"Got to get up and above it—find some reason for it," he mumbled. "I think it drifts with the wind. You'll notice that every tailwind we get follows the path. Cur-

rents. Might miss Nome by a few miles."

The air about us was getting hotter and hotter. It became stifling. We could hardly breathe. I thought Captain Blaine would turn and run away from it, but instead he gained altitude until we were at twenty-three thousand feet, from which distance the bright ray of fire took on a different aspect. It seemed to be about a mile across; from bottom to top it did not vary more than a few yards. It continued to move with the wind like a huge cylinder, being blown along. The radiation of heat was such that we had to remain several miles away from it. Sometimes we circled it, only to come around again behind it and watch it cross the tiny islands and leave the surface a charred mass, dip into the sea and boil it with the suddenness of a red hot iron being dropped into a glass of water.

Captain Blaine ordered me to inform the weather bureau and the officials of the company of what we had found. Fred Brettner was on the telephone when I called the offices of the International Airlines. No sooner had I described the strange phantom of destruction than he began making suggestions, in spite of the static. "Fly above it if you can—your plane is good for thirty-six thousand feet, and she's all metal. Pull on your oxygen masks and dive into it as far as you can. Bring back some idea as to what causes it—I'll have the government patrol to your assistance if that will help."

I thanked Brettner and hung up. Informing Blaine of his suggestion that we fly above the cylinder of flame, the captain immediately extended his wing surface and kicked the throttle open. A few minutes later we were at thirty-five thousand feet. Our oxygen masks were adjusted and the tanks were turned on. It was then that Captain Blaine slowly edged into the path of the cylinder, and we discovered that the top of it was on an elevation of about thirty thousand feet. He kept the nose of the plane down in the direction of the ray until the heat stifled us, and shot the plane several thousand feet up into the sky, almost before we realized it. He fought with the controls and he was nearly exhausted before they responded. I looked at the alti-

meter; forty-three thousand feet! And directly below us was the flat top of that cylindrical ray that so astounded us. It was moving with the wind.

"A—chemical—compound of some kind!" gasped the pilot at my side. "A freak of nature—or an experiment of some sort running wild. Well—!"

The Moving Destroyer!

HE pointed off to the right, just over the edge of the "ray". A great plane hung there, weaving in and out of the cloudy edge of it, her motors full out, her nose pointed downward into the face of the terrific pressure of heavy air that came from the hot spot.

"Why doesn't he run away from it?" screamed Blaine over the whirr of the motor to which he had given full throttle. He nosed the plane downward into the face of the pressure, and despite the great power that pulled our plane, despite the fact that our nose was pointed straight down, we found difficulty in descending. We sweltered under the heat and gasped for breaths of air from our oxygen tanks as we dived straight into the top of the thing.

As we neared the great cylindrical cloud it took on the aspect of a gaseous substance; its color seemed to change as we looked down into it; it was no longer a yellow light ray; it became a cloud of vapor-like stuff, but the temperature was the same. We watched the other plane while our motor strained in its effort to pull us downward, and we saw that the great craft was turning from the mass and flying away, going off at an angle to escape the center of that terrific updraft.

I suggested to Blaine to follow the other plane. He pulled the nose up and shot out toward it. It was apparently trying to escape us, was almost out of sight before we thought to take in some of our wing surface and give chase. However, it was not long before we were gaining on it, and the mass of heat fell over the horizon behind us. We were headed in the direction of Seattle, with a strong wind pushing us along.

"Get his number—don't lose it!" Captain Blaine shouted as we sped down upon the tail of the fleeing ship.

"AF3675" I announced as we came alongside the giant monoplane.

"Holy skyhooks! Where have I seen that plane before?" exclaimed the captain. "Do you see that tube running from the lower side of the fuselage?"

"What has that to do with it?" I asked excitedly.

"That's Professor Edwin Metter's chemical laboratory!"

"What—starting something he can't stop?"

"Met him when he dropped in for supplies at Tokyo on my last run down there. Thinks he has a way to change the climate of the arctic regions. I guess it got away from him."

We flew down upon the other plane. Her five great motors were wide open, but she made little noise. I opened a window and yelled through to a pale little man who stood looking at us through an upper port hole. Shamefaced, he opened the hinged cover and tried to speak.

CHAPTER III.

Devastation!

THE shaky little man was plainly confused. His hands played over the port hole and his face twitched. The slipstream played havoc with his thick shock of white hair. He had all the appearance of a wild man, and yet his appearance was pathetic enough to cause us to laugh in the face of what appeared to be a great danger. "I'll manage it yet," he screeched. "Got the mixture too rich—too rich—too rich!"

"What does he mean—mixture too rich?" I asked Captain Blaine.

"Ask him!"

My inquiring look brought an answer from the professor.

"I—I—put too much of the—element that caused the heat to form in the chemical—going to Vancouver for more—got to stop it before it gets to the coast!"

We had to think fast. I turned to Captain Blaine. "You have a faster ship—"

"But his plane is fitted to handle the stuff—we'll run around and follow the thing until he gets back." And with that Blaine swung the little plane about and headed for the vicinity of the "Hot Spot."

"Better report it to the office", he suggested.

"That's a joke," I said. "The static, even down here, interferes too much. It has become useless to try to talk. Hear nothing but a crashing noise. It will rain torrents around the cloud of fire."

My prediction was true. When we again came up with the sweeping, sweltering thing we saw that storm clouds had rushed into its wake. As darkness fell, torrents of rain beat upon the plane. We changed our course and fell in before it. Its speed was slower now, but a breeze caused by the piled-up air in its rear was pushing it along toward the coast. I checked our position and course and found that kind Providence had directed the thing to the south of Nome. We came upon the coast before we realized it, and then what we feared began to happen. Everything within half a mile on either side of the great cylindrical cloud became scorched, and directly beneath it great trees withered, became dry and blazed. A path of absolute destruction a mile wide was being cut across the Alaskan wilderness, and we were drifting toward the Canadian Northwest.

"We must get ahead and warn everybody!" shouted Captain Blaine. He opened the throttle wide and calculated the course of the cloud. I looked back at it in the gathering darkness. It took on a rose-colored hue in the center; its now ragged sides were blue and green and gold like a rainbow. What a magnificent thing it was! And how useful, providing its elements were not mixed wrongly. Knowing that I was not likely to be familiar with the different elements, the nervous little professor had simply explained that "the mixture was too rich."

I could hardly contain myself for laughter at this pathetic little man who was so frantic over the loss of control of his great discovery. I could imagine him screeching orders at airport attendants in an effort to

rush some of those strange chemicals abroad.

WE preceded the chemical cloud about two miles, but saw no sign of habitation. Yet we knew that in our wake was a strip a mile wide and many miles long lying desolate because of this wild dream of the little scientist. We hoped he would return quickly. Before three hours had passed we were far inland. The cloud seemed to be disintegrating very slowly, but when we flew near it still cast off a sweltering heat that drove us away again. We could do nothing but watch the progress of this fool thing as it passed onward into the interior.

Then came anxious moments. We were coming upon a Canadian town. Blaine flew over, his siren open, yelling through the cabin window to the people in the streets below. The cloud was only three or four miles away, and headed directly for the center of the village. They only half understood, and yet they called others, and looked off to the west. One family after another took to planes, some of them crowded and overloaded, but all of them managed to lift from the tiny airport in the edge of the town.

"Something must be done immediately!" said the captain as we watched the planes take off. The cloud was approaching the town, destroying everything in its wake. We flew about until the last plane had lifted and then waited. The thing came down upon that village like a cyclone, burning through it and after leaving it a desolate wreck veered off to the south toward a more thickly populated area. We dreaded to think of what might happen next.

We were flying about, helpless, fighting the terrific air currents that resulted from the heat. We raced down over farmhouses and opened the siren. We rushed to homes on both sides of the apparent path of the thing and made all the noise possible. We landed at a village presently, some fifteen miles ahead of the cloud, and found the place deserted save for a single police plane that sat on the tarmac at the village port.

"We got it by radio," explained the officer. His red coat that had been quickly buttoned reassured us, and we hurried onward. We turned to follow the cloud once more. Just as we came upon it Professor Metter's plane came burning the wind up from the south. We recognized the ship by the number we saw as we played our floodlight over it. And then we saw the brave little professor's giant plane edge into the top of that cloud, saw a stream of liquid come from the tube and fall into the densest part of it, saw it change from its rosy-hue into a mild yellow, from that into a haze, and finally into a bluish tint. We knew he had brought the cloud under control.

It is like getting ahead of the story to have told you all this, but it is the way it happened to us. Professor Metter explained it to us later as we ate a welcome supper in a nearby roadside hotel.

"I had that idea for years, but it was difficult to get the correct compound. The correct mixture of hydrogen and oxygen and the other chemicals that go to the making of this artificial atmosphere are cohesive, as you have seen. I had a volatile alkaline base, but I couldn't mix the elements in the plane—there'd be an explosion. I had to release one at a time from the different containers in the plane. The idea is all right you'll agree. Why, wherever the wind blows that cloud for the next thirty days people will have warm weather."

An important looking man followed by a crowd came up to our table and stood before the little professor.

"You have brought ruin upon farmers across the entire country. There are reports of houses being burned—"

"Was any one killed?" asked the excited little man.

"No, but you're going to face some big damage suits," said the man.

The professor pondered a minute. Then he looked up at the man and said, "Not far east of here lie the trackless wastes of the Canadian wilds. The Canadian government was the first to become interested in my experiments. Canadian statesmen are responsible for what I have done thus far. They were interested because I promised an Eden of tropical lands where now glitter the snowy stretches of the great Northwest. I am sure we can repay all losses in land."

There was a moment of stunned silence.

A shout went up from the crowd, cheers shook the house. They stopped when the professor's lips moved again.

"I can make a jungle out of the arctic, a land of steaming forests and banana plantations. There is no limit to the number of chemical compounds. Don't you agree that it's a wonderful discovery?" He twiddled his thumbs and smiled upon the speechless throng.

"It's an astounding invention, all right," drawled Blaine. "But how about that plane of mine? How did the stuff happen to cut into that wing like a pair of scissors and leave the rest of the ship intact?"

"I'll—I'll pay for that—I'll make it right!" said the nervous little professor. "I got the mixture too rich!"

THE END

FOR "NEXT MONTH"
TURN TO PAGE 895

See the announcement of the galaxy of science fiction stars

RAY CUMMINGS

DR. DAVID H. KELLER

P. SCHUYLER MILLER

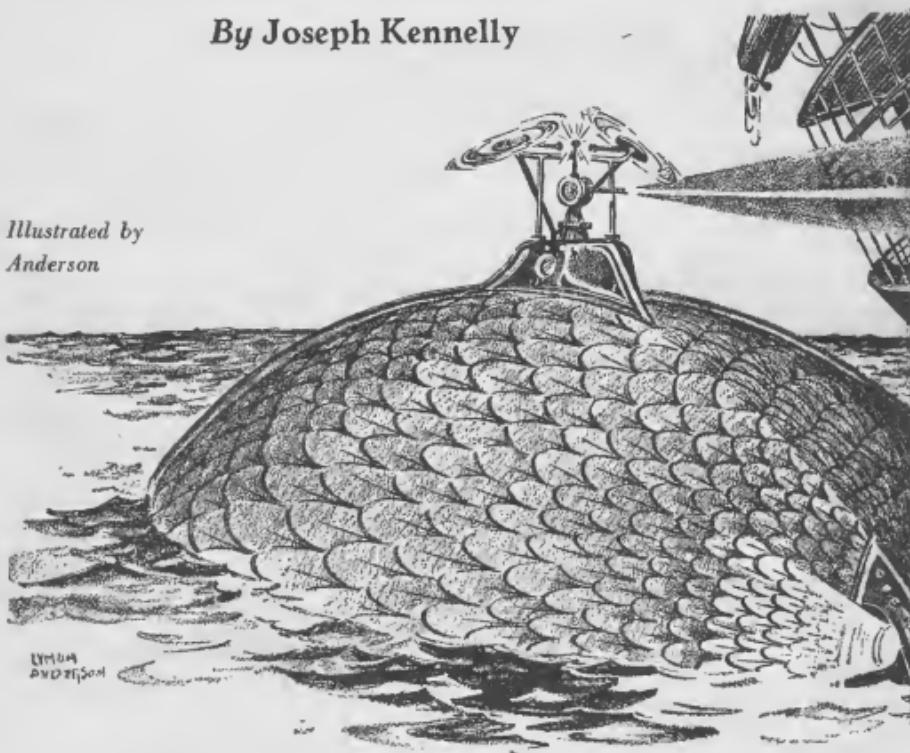
JOSLYN MAXWELL

FOR "NEXT MONTH"

Death from the Seas

By Joseph Kennelly

Illustrated by
Anderson



THIS is the story of the almost incredible Sargasso Sea mystery and of an adventure which sounds a little mad but which was actually based on a series of facts thrilling and amazing to the entire civilized world.

Lest readers of succeeding generations attribute facts which follow to an unbridled imagination it should be remembered that the salient points in the narrative were emblazoned across the front page of every newspaper in the world when the expedition I am about to describe returned. Several scientific books were also prepared from data obtained during the adventure.

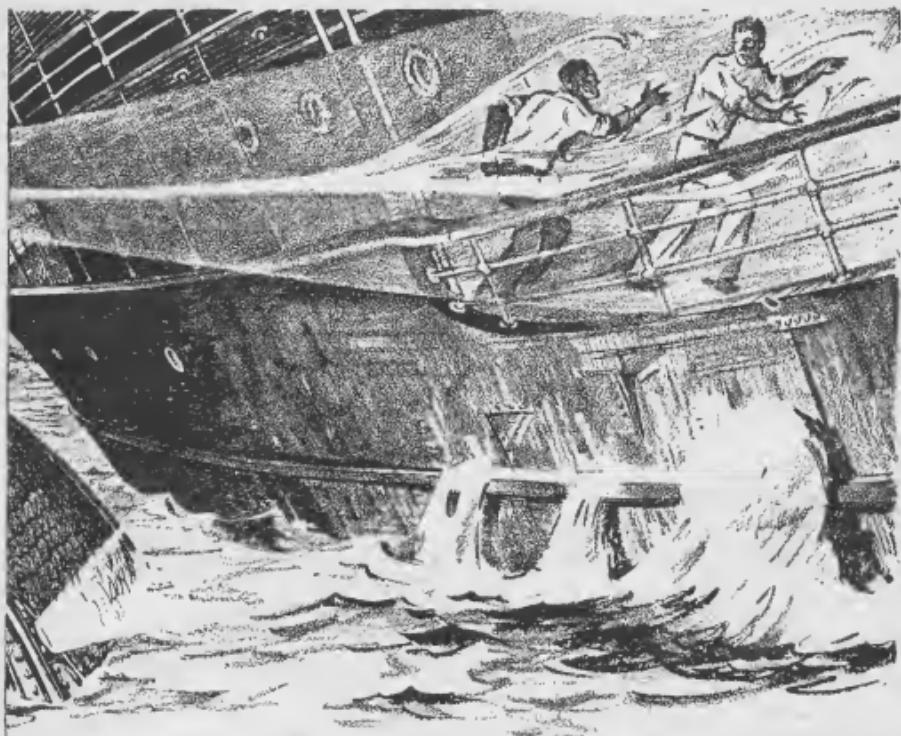
As for my own part in this story I can truthfully say it was inspired first by my search for my sweetheart Marna, and second by my natural love for indulging in

hazardous undertakings. I had the powerful double objective of trying to find the girl I loved and aiding in solving a mystery which piqued the curiosity of all who were acquainted with it.

The Sargasso Sea mystery, like many other events of major importance, began in a manner which excited passing but not unusual interest. The disappearance of the *Marovia*, a freighter carrying a cargo of coffee from Rio de Janeiro, was the first link in the chain of mystifying circumstances. Prospects for the trip were favorable when the *Marovia* left port.

When the freighter was two days out, the Atlantic Coast Company, the corporation which owned the ship received a radio message that all was well and that an exceptional time record was apt to be set on the

*From the Ocean's Depth
Came the Terrible Threat
of Doom and Destruction!*



Thin streamers of deep orange cut through the air like exploratory fingers. In our terror, they were tentacles of some enemy.

trip. That was the last message ever received from the ill-fated *Marovia*.

There was not even the customary S. O. S. of a vessel in distress. The ship had apparently disappeared from the face of the ocean. Vessels in that vicinity could give no information on the supposed disaster. The *Marovia* had simply failed to reach its berth in the East River, New York. No clues were discovered in the official investigation ordered by the owning company following the strange disappearance.

At the time the last radio message was sent the *Marovia* had been in the general vicinity of the Gulf Stream. She had last been sighted in that vicinity by the *Island Queen*, whose captain noted the fact in the ship's log and gave the customary greeting

as the two vessels passed each other. The captain of the *Island Queen* perceived nothing wrong in the appearance of the *Marovia*.

The disappearance of the freighter was given front page attention in the metropolitan dailies but the announcement was not accompanied by the excitement aroused by subsequent reports of lost vessels.

Uneasiness became apparent in maritime circles when a second ship failed to make port. This time it was the *St. Paul*, a Tropic Navigation steamer outbound from New York. Its destination was a Central American port. Again the last radio communication from the ill-fated boat was received just before she reached the Gulf Stream. It was a regular report stating that all was well. But it was the last word

the owners ever received from the ship and its crew of twenty-four men.

The probable fate of the two ships became the topic of wide spread speculation. Many persons wrote to the newspapers offering possible explanations. Public discussion became so strong that the United States Government sent a Coast Guard boat to the scene of the two mysterious disappearances.

Not even a final radio message heralded the disappearance of the Coast Guard vessel and its crew of eight!

The affair had assumed serious proportions by that time. Freight carriage between the United States and the tropics was suffering.

As I look back on that time of turbulence in maritime circles it seems that there was a sort of regularity in the way the boats were reported missing. Each was last heard from in approximately the same Gulf Stream location. The disappearance occurred at intervals of about every seven days. Not once was an S. O. S. picked up by any of the stations tuned in on the area.

Despite the fact that traffic was considerably cut down on ocean trails adjoining the mystery area a total of thirty-four ships went to an unknown fate in it.

DEPREDATIONS, if such they were, became so drastic that the countries whose maritime shipping was involved, by international agreement forbade ships venturing within a three-mile radius of the dan-

gerous territory. Special Coast Guard cutters were assigned to the outer circle of the radius to warn vessels, and if necessary force them to abide by the ruling. A long detour, agreed upon by the countries whose commerce was threatened, provided a safe but more costly and circuitous route.

A special investigation board was formed by the various ship corporations. But efforts of the board were fruitless.

An attempt to solve the mystery that attracted wide spread attention was the expedition fitted out by the *New York Times*. I cite it as an example of what the press has often done in the interests of public safety.

There were two ships in the *Times* expedition. It was planned for them to work independently. Each was completely outfitted with the most modern equipment obtainable. Much of this equipment was donated by sympathetic companies and individuals.

Every known precaution for sudden emergencies was provided for in the equipment. Naturally the radio receiving and sending sets were of the most advanced types science could offer.

One of the noteworthy features of the communication system was the use of radio beams. The leaders of the *Times* expedition were assisted in working out details of the radio beam use by scientists from the Paldron Institute.*

*The radio beam had been experimented with as far back as 1930 but did not come into general use until some years later.

WITHIN the depths of the seas reside some of the most intriguing mysteries of nature. As far down as we have gone, but a few hundred feet, we have already discovered strange forms of fish life—life that has adjusted itself to the great pressure and the sunlessness and airlessness of the watery deeps. What might we find at a depth of a mile or five miles where the pressures are terrific and the waters intolerably cold? Man is already attempting to find out—for construction of a diving equipment to go down over a mile is on the way.

It is also possible that some time in the remote past a great cataclysm may have changed the formation of the earth and the seas depths and produced a type of life totally strange to us. Whether this story deals with that problem we cannot tell—for there is a corking good air of mystery here that we cannot spoil by too many hints.

These radio beams (there was one for each ship) operated from a land station located on the Florida Coast. The continuous beam emanated from the land station and maintained constant communication with both ships. The beam was registered on tape, ticker machines being located on both vessels as well as at the land station. Thus the slightest deviation from the true course by either ship would be instantly noted, both by its companion craft and at the land station.

Theoretically the radio beam idea was a perfect method for maintaining constant communication. Events following the start of the expedition merely proved the fallacy of placing entire faith in a machine or a mechanical arrangement.

Details were checked and equipment thoroughly tested before the *Times* expedition left New York. Radio communication with the two vessels was maintained satisfactorily, messages being received many times daily.

The first piece of startling news from the expedition came when a message was flashed to New York stating that a life boat from the *St. Paul* had been found.

The bodies of a man and a woman, charred beyond recognition, were in the floating hulk.

In the midst of this startling message, communication was suddenly cut off with the broadcasting ship. The unfinished message was picked up by several stations. Radio beam communication from the ship also ceased abruptly. Then the radio beam from the second ship suddenly terminated, also. A listening world was literally kept gasping.

Both ships in the *Times* expedition had vanished as completely as had the other crafts lost in that treacherous strip of sea. A seaplane dispatched from the Florida

coast to search for possible wreckage on the water might well have taken off for eternity. Seen for the last time winging out over the sea, the fate of the plane, like that of the ships, remained unknown, until the mystery was finally cleared up.

The *Times* expedition has gone down in history as a sincere but futile effort. The names of those who lost their lives have been remembered in the monument erected to their heroism at Union Square.

You may think I am devoting too much explanation to the expedition sent out by the *Times*. But had it not been for that expedition I would never have become personally interested in the Sargasso Sea mystery and with all modesty I think I may add that its secret would still be locked in the ocean bottom.

Because Marna Montgomery was aboard the flag ship of the *Times* outfit. And when Marna disappeared I would have used whatever puny strength I possess in moving heaven and earth, if necessary, to discover her fate and solve the horrid mystery of the Sargasso.

Marna was a spirited girl whose beauty was matched by her impetuosity.

As a woman reporter on the *Times* she had had her share of journalistic thrills. But when plans for the *Times* expedition to the Sargasso Sea were announced, Marna forthwith decided that the job "covering" that undertaking was to be the crowning jewel in her list of newspaper exploits.

She would listen to no entreaties against undertaking the perilous voyage. But she did agree that when she returned *finis* was to be written on her professional career. She agreed then to become my wife and settle down to the comparatively prosaic task of juggling the salary of a wireless telegrapher. At the time I was serving on



JOSEPH KENNELLY

the *Toltec*, which plied between New York and Cuba.

Imagine my anguish then, when that last radio message from the *Times* expedition was cut short. For a time I thought I would actually lose my mind. Then it was that my company decided to sponsor a final effort to clear up the mystery. I eagerly volunteered and because of my knowledge of wireless telegraphy was accepted for the hazardous undertaking.

The company was in really dire financial straits as a result of the unexplained oceanic tragedies. Eight of its best ships had gone into the maw of the Sargasso. Their loss had disrupted the freight-carrying schedule and because immediate adjustments had been necessitated, many of the most profitable contracts had been lost. Then, too, the cost of operation had been materially increased by the addition of the 700-mile detour prescribed by the government.

THE route of the *Toltec* did not quite penetrate the forbidden area, although our course was near the scene of disaster. At that our proximity to that portion of the sea aroused fearful apprehension on the part of many of the sailors. Personally I have never subscribed to the superstitions of either land or sea. I felt that there must be some human agency or logical explanation behind the disappearance.

So when my company decided to make a final desperate effort to solve the mystery, I pressed my claim as a member of the party. To be frank there were not many volunteers and my personal interest in solving the riddle aided me in securing one of the two berths open.

Officials of the company had decided against sending a large vessel into the area. They reasoned that this had been unsuccessful in previous attempts and that a smaller craft would probably have a better chance.

The plan was outlined to me by McAndrews, terminal superintendent, at a conference of line officials to which I was summoned.

He explained:

"The plan we have finally decided upon

is to send a small motorboat carrying only two men into the area.

"We shall take all possible precautions to insure your safety but after you reach the area the rest will depend on yourselves."

He motioned to a silent figure half-concealed by the shadows in one corner of the room. With a start I recognized Novak! Realization that I was to have that famous adventurer as my companion added zest to the affair.

But McAndrews was continuing:

"We believe that you will have a good chance as you will not be hampered with a large vessel which may attract the attention of your unknown enemy, if there is an enemy.

"This simple plan may succeed where the more elaborate attempts of others have failed. If it doesn't—well it means the financial ruin of those who are left behind."

After the plan had been thoroughly outlined to Novak and myself, we were given an opportunity to change our minds if we wished. McAndrews and the others who sat about the conference table impressed upon us the dangerous nature of the mission and urged us to withdraw if we felt any hesitancy in the matter.

Spurred on by eagerness to discover some clue to Marna's fate I eagerly waived all suggestions that it was not too late to withdraw. Novak was equally determined to go. In his strange career the unknown had always exercised a peculiar fascination for him. A tragedy of his early manhood had apparently robbed him of the desire to live. He had engaged in one mad adventure after another, always emerging with his ill-prized life.

McAndrews admonished:

"I must remind you that the chances of your emerging alive from this undertaking are absolutely against you."

Then finally he said: "Do you still wish to go?"

There was a moment's silence in the room.

Then I said: "I am perfectly willing to take the risk." Adding: "There is only one reason for hesitancy on my part."

McAndrews asked quickly:

"What is that?"

I replied: "That is that my mother shall suffer no financial embarrassment if I am lost."

"You need feel no worry on that score," McAndrews replied. "She will be well provided for as long as she lives, if you fail to return."

Novak, always a man of few words, gave an almost taciturn affirmative to McAndrews.

As this time I think it opportune to tell you something about Novak. As the company's foreign representative he traveled almost constantly and was a familiar figure in the picturesque ports of call on our line's routes. He had figured in several Central and South America peccadillos and had weathered the storms of political intrigue many times.

More than six feet tall and of athletic build he was a commanding figure. Although reserved, his mien was pleasant and his personality attracted and held attention wherever he went. His indomitable strength of character was reflected in piercing gray eyes and an aggressive profile. His blond hair was streaked with gray.

Varied adventure had punctuated his career even as a young man. The countries to the South of us had always interested him and he had engaged in their turbulent politics, to his later sorrow. While in his early twenties he had wooed and won a Spanish girl, noted for her beauty and intellectual attainments. They had removed to a South American rancho presented to Novak by a grateful friend, whom he had rendered a valorous service.

Then revolution flamed across the country and Novak's wife fell a victim to its brutalities. She was captured and her execution ordered by the revolutionary chieftain. Novak, who was absent from home at the time, attributed the cold blooded murder to personal malice directed toward himself.

A short time later the governor's palace resounded to the shrieks of servants who discovered that the revolutionary leader and his entire family had fallen victim to a swift and little known poison. The multi-

ple murder was never conclusively proven to have been done by Novak although the crime was generally acknowledged and even applauded in some circles as a just revenge.*

CHAPTER II

The Derelict

THE United States Government was quick to offer its aid to the company for the perilous undertaking. Navy seaplanes were stationed at our Florida Coast base and other aids offered us.

We flew from New York to Florida. Both Novak and myself were quiet and thoughtful on the trip. We did not attempt much conversation. Partly due to our own inclinations and partly due to the monotonous roar of the three powerful Diesel engines our plane was powered with.

Fantastic thoughts and improbable theories flashed through my mind on that trip. Theories which I had seen advanced in the columns of science fiction story magazines permeated my mind and I toyed with various ideas inspired by these stories, of which I had read many, and tried to adapt them to the problem at hand. Novak appeared to be sunk in an introspective mood.

The plane winged south at a fast clip. Air travel was no novelty to me and I took slight interest in the panoramic vistas which unfolded beneath us. In fact with the prospect of our great adventure before me the flight proved rather boresome and I sighed and stretched with relief when we deplaned at Key West.

An official United States Army car met us at the air field and took us to the dock where a Coast Guard boat was awaiting us. We boarded the cutter and soon were on our way to the edge of the forbidden area. There our motor boat was lowered over the side and we bade those aboard the cutter a sober farewell.

Our motor boat was a small, compactly built craft. It had two small cabins of cuby hole proportions. A heavy sea would

*This attitude toward the affair was taken by the author of an article on Novak's colorful career which appeared in *The New Republic*, pages 56 to 64, in April, 1935.

have speedily capsized our floating home but as the tropical storm season was past we had little to fear in the way of weather. Food and fuel sufficient for a month's cruise were on board, although we hoped to satisfactorily end our mission in much less time than that.

When we shook hands with officers aboard the Coast Guard boat, it was apparent that they never expected to see us alive again. We were serious, naturally, and the good-byes of our companions were almost disheartening.

Soon we were flashing through the sparkling sea and thoughts of death and danger seemed far away as we reveled in the motion of the smoothly performing boat. Our motors, there were two, vibrated gently and soon we were in the midst of the dreaded area. The "V" edge of our bow cut the water like a knife and sent pearly cascades of water back in a delicate shower.

I was at the wheel. We had worked out a plan whereby we would stand three-hour tricks at the wheel during the daylight hours and float at night. As we had no particular goal and could ascertain our position at any time by instruments this plan was calculated to conversed our strength for the vigilant search we planned to make.

We cruised about the area all of that first day noting nothing unusual. I began to penetrate Novak's shell of taciturnity and discover the qualities that cemented our lasting friendship. The loneliness of our surroundings, the nature of our mission and the sense-quickenings qualities of being in a death defying adventure together, rapidly ripened our association from superficial to deep friendship.

On the third day out we discovered our first clue. It was also the first actual intimation of the amazing, incredible adventure which befell us.

I was standing at the bow, scanning the horizon, while Novak stood his turn at the wheel. The monotonous vista I was gazing at was at once dismal and disgusting.

Much of this portion of the sea was covered with a weed from which a nauseating stench arose. The thick, greenish scum, which is characteristic of the Sargasso

alone, covered the sea weed. The odor was an abominable one. In fact it was all but unbearable. I do not consider myself a squeamish person but that retching smell all but made me ill.

Our very food seemed permeated by it and the consumption of meals became an almost unbearable ordeal.

On this particular day as I stood at the bow I was reflecting on the vagaries of the human mind. I thought of the inadequate existence most of us lead, immersed in selfish desires; sating them; engaging in warfare less human than that waged by the lower animals; and withal complacently contented with ourselves. Pictures of our self-important business men, the executives in our big cities, occurred to me and I thought how insignificant their might was when compared to that of nature.

Thoughts of this kind usually lead to bitter introspection and then develop into a morbid contemplation of our daily existence which is detrimental in a mental sense. This psychological phenomena is interesting and absolutely true, as any student of the science will tell you. I was deeply buried in self-pitying introspection when an excited sound from Novak brought me out of my reverie with a start.

Glancing up, my startled gaze encountered the looming bulk of the nearly unrecognizable hull of the *Marovia*, the first ship which had disappeared in the Sargasso Sea.

SHE was tipped sluggishly to one side and rolling slightly. Her sides were charred and encrusted with green scum. The sides and hull looked as though fierce fire had swept them. Yet the masts, stanchions and cargo booms were untouched. The steel sides appeared to have borne the brunt of the devastating flame.

But the phenomena that later aroused my excited cry was not immediately noted by me. When my roving gaze did rest on it, I gasped. It was this. The entire bow of the vessel, from rail to waterline, and from the end of the well deck through the forecastle, was one mass of fused metal.

It looked as though some shaft of superheat, like veritable fingers from hell, had

reached out and melted the metal in the ship. The vastness of the destruction was appalling. I knew that no instrument known to the world could wreak such havoc. I shuddered at thoughts too horrible to voice.

Novak and I stood speechless. A cold sweat had broken out on us.

Finally Novak regained a measure of his composure and said:

"I guess we'd better board her."

Although the prospect was temporarily unnerving to me I borrowed from Novak's calm and prepared to aid him in pulling our boat alongside the spectral *Marovia*.

It had become increasingly difficult for our craft to move through the water before we spied the wrecked ship and it was with real difficulty that we forced our small boat through the clinging fields of sea weed and finally pulled up against the *Marovia*. Tying our craft to what had once been the anchor chain of the stricken boat, we began clambering up its side.

More than once I cursed to myself during that climb. Jagged pieces of splintered steel tore at my flesh and clothing. Novak, as usual, stood the ordeal with fortitude.

My audible sigh of relief, when we reached the deck, sounded strangely loud on that freighter which once had proudly plowed through gale swept seas.

"We'd better take a look at the deck and the staterooms first," Novak suggested.

There was nothing on the deck or bridge to arouse comment. Then we started a tour of the staterooms. As you know every freighter has a few staterooms reserved for the use of infrequent passengers and company officials.

In every cabin we found the same condition. Floors had been ripped up and walls demolished. The significant fact was that while apparently nothing else had been taken every bit of steel was gone.

A ghastly revelation awaited us at the end of the deck. Those aboard had evidently fled for protection to the last stateroom and barricaded the door against some enemy, unknown to us. This door had evidently been literally burned from its hinges. Although constructed of thin sheet metal it

apparently had been an easy matter to penetrate it with a weapon powerful enough to inflict the damage we had already noted on the steel bow and other parts of the ship.

Huddled in the far corner of the room were the pitiful remains of the ill-starred crew and passengers. Charred corpses, burned to a crisp, were piled in a grotesque heap.

Softly cursing. Novak surveyed the horrible scene.

Finally in an awed voice I asked: "How do you explain it?"

"The only theory I could advance is still hazy," Novak replied. "I must find more corroborating evidence before attributing it to more than distorted imagination."

Then, after a moment of thought—

"I will say this much, though, because it is proven by the evidence before our eyes; a heat ray of some kind is involved in this tragedy.

"Look at the condition of the ship's bow, this door, and those," motioning to the pile of bodies, "that is the only way those things can be explained."

"I had somewhat the same thought, Novak," I admitted. "But it seemed so fantastic I hesitated to voice it."

Thoughtfully Novak replied: "The idea at first seems improbable to us because it is a radical departure from anything we are familiar with. "But the use of a powerful heat ray is no new idea in the scientific world. As far back as 1789 the possibility of such a ray was mentioned and experimented with unsuccessfully."

"A German made progress with the idea in 1928 and did actually develop a ray of comparatively small effectiveness. He killed rats, guinea pigs and small animals during his experiments.

"In a reverse manner the ray was used to promote the growth of vegetables. With a milder application than that used on the animals he was able to cut in half the time usually required for a tree to mature.

"You have heard of the vibratory ray which wrecked the Harvard laboratories in 1936 killing all those who knew the secret of the invention.

"To explain the theory in a simple way,

I will cite the well known fact that a substance the size of a football heated to the surface temperature of the sun would shrivel any human being or inanimate object within a radius of a half-mile.

"**N**OW suppose you had a fragment of such a substance and put it in a tube insulated at all points except a small opening in the front. Thus the heat could travel out of the tube in only one direction, namely the front.

"Assume, too, that by pressing a tiny button you could set into operation apparatus that would heat this theoretical fragment to the temperature necessary for your purpose. The operator would thus be able to control, aim and fire at will. At the same time he would be adequately protected by the insulation.

"The result would be a weapon so effective that any nation having it would be able to dominate the world. It would be the deciding factor in any war. Now I believe something similar to this theoretical ray I have been describing has been used here."

He paused leaving me gaping in wonder.

Finally, motioning to the mute group, I asked: "Who do you think is responsible for this wholesale destruction?"

"Your guess is as good as mine," Novak replied. "So far as I can see nothing has been removed from the ship but steel. Why all these lives should have been taken I don't know. There was no mercenary advantage to the attackers as the ship carried no bullion. The cargo has been left untouched, as you can see."

"A nation seeking to ruin our marine commerce would not operate in this manner. Besides many vessels have been lost which belonged to countries other than ours. No, Bob, I am afraid our solution lies elsewhere."

This rather excited conversation had been carried on as we stood beside that pitiful pile of dead. Now our thoughts came back to it.

"We can at least give them a decent burial," Novak suggested.

A search for canvas revealed that and

some strong cord in the ship's storeroom. Returning with the canvas and cord we began the ghastly task of sewing the bodies into individual sacks and weighting them. Twilight was on us before we finished so we decided to postpone the actual burial until morning.

Although we made a brave attempt neither of us at much that night. And I must confess we slept but little. Rising early we prepared to finish our self-appointed gruesome task.

While Novak prepared our breakfast I decided to look over the wireless apparatus on the ship. I wanted to find out why the operator had not sent out an S.O.S. in the face of such imminent danger.

Looking over the equipment I found everything to be in perfect order. So far as I could discover the wireless apparatus was functioning smoothly. I got a satisfactory spark in testing the set and decided that whatever disturbance had interfered with the sending of a message had been only temporary.

I thought of sending a message out over the set but hesitated for fear whatever enemy was responsible for the condition of the *Marovia* might pick up the code.

After a breakfast devoid of conversation, Novak and I went forward with the burial. He had found a Bible in the captain's cabin and read from it. As the solemn intonations of Novak's voice pronounced the scriptural passages he had selected, I let the bodies slide over the rail, one by one, into the placid water.

After the last body had been lowered to its watery grave, we stood with bowed heads for a moment. The sunshine was streaming down on us but it failed to lighten the gloom of our spirits. The water which had engulfed more than a score of bodies ceased to gurgle and as it became calm again a large field of greenish sea grass floated over the fatal spot.

CHAPTER III

Fingers of Doom

FOllowing the emotional strain of the burial neither Novak nor myself

felt like continuing our explorations that day. We had previously tied our motor boat to the side of the *Marovia* and by tacit agreement remained there that day.

We were standing in the bow of the *Marovia* discussing our next move. I broached the idea of continuing our search for the other lost vessels but Novak vetoed this suggestion pointing out that we had by no means completely examined the derelict we were aboard.

Suddenly I noticed Novak grow tense, as though some sight or sound had aroused his suspicion. He thrust a warning hand on my arm as I started to speak. Then I heard it, too.

A low humming whirr which rose rapidly to a high pitched whine. The very air seemed to vibrate with the unusual force of the sound. It seemed to be coming from the side of the ship, and beneath it.

Cautiously creeping to the side of the *Marovia* I peered overboard. At first I saw nothing. Then I noticed a queer and unnatural effulgence coming up from the murky depths of the ocean.

Some phosphorescent object seemed to be coming to the surface. The water began to boil and I saw that a circle of clear water was rapidly widening as the sea weed and other surface material was forced back.

Then I saw it! Rising out of the water its phosphorescent sides dripped with water. Similar in some ways to a submarine it had the same elongated shape with a fuller looking tower that alone marred the symmetry of its smooth lines. There were no ballast tanks along the sides, either.

The motors ceased their eerie whine as the thing rose to the top of the water. A curious silence followed.

I cannot with mere words describe the queer machine I beheld. It was larger than a submarine and its entire outer surface was covered with a series of scales, similar to those found on a fish. The scale-like covering produced the phosphorescence I had first noted. Yet there was no sign of aquatic life in the object. It was unquestionably a machine powered with some type of motor strange to us.

The queer craft came to a halt except for a gentle rocking back and forth occasioned by the waves. Then a section of the top slid back with a grating noise.

Novak hissed in my ear:

"Hide! God knows what is in there."

Instantly I whirled and with Novak close behind me ran towards the middle of the boat. Our running feet made a reverberating sound on the empty deck and the next moment I was cursing our folly at having forgotten that. Continuing, though, we dived into hiding behind a pile of tarpaulin slung carelessly into a heap on the deck.

Crouching there we heard a shrill whistle. The sound resembled the siren on a fire truck more than anything else I could associate it with.

Peering from our hiding place we noticed a blue radiance which slowly became visible in the air about us. It rapidly grew in outline and began to assume a definite shape. Benumbing fear sent fingers of ice to constrict my heart.

The radiance continued to grow in intensity until a well defined aura of blue flame enveloped the entire ship. There was a charged feeling in the air as though electricity might be the force back of the phenomena.

Gradually the aura of blue flame began to localize and change to a deep purple hue. It was a magnificent display of force for which I had no doubt there was a perfectly natural origin or explanation.

Every color in the spectrum now became apparent. Thin streamers of a deep orange color cut through the air like exploratory fingers. They wavered, groping, toward the the dim corners of the deck. They almost seemed possessed of an intelligence of their own as they slid along the rail as if in search of something.

In our terror it seemed to us they were tentacles of some malignant enemy reaching out to find us. I gasped involuntarily as the full force of that idea struck me.

Blind, unreasoning fear began to flow through my veins and pervade my very being. Shivering violently, I crouched lower. Then the scene began to turn black. It seemed to me that a veritable sash of crepe

was falling across my soul. In the complete absence of light the darkness itself seemed to be possessed of substance.

The darkness lifted for a moment. All was quiet. And then I heard Novak cry out. His hoarse scream sounded distant and unreal. It ended abruptly as though some antagonistic hand had reached out and throttled him.

Lurid light was shed on the deck for an instant by a brilliant purple flash which caused me to fall back. By that time I felt as if the foundations of my sanity were reeling. I seemed to be living a horrible, inconceivable nightmare.

THEN I realized that the flash had seared me, scorching my hair, brows and lashes and all but burning the clothes from my body.

I screamed and heard no sound. I beat my hands in futility against my breast and felt agonizing pain as a result. I had a mad impulse to throw myself over the rail.

Rising to follow that impulse, which to my disordered mind seemed a desirable end to my horrid dream, I felt something cold and clammy clinging to me. I also had a burning sensation in my back, not unlike that produced by contact with certain kinds of fish which have the power of inflicting terrible electric burns.

Terrible pain shot through the small of my back. Then I stumbled with outflung arms and sank into the depths of merciful oblivion

I seemed to be floating on air. There was a curious feeling of elation in my body. Briefly, as I regained consciousness the mental predominated over the physical. Then I became aware of my aches and pains. I saw that one of my arms was blackened and blistered. Pain was coursing through my entire body in a steady, unceasing rhythm. I cried out involuntarily and almost fainted from the pain.

Through the mists that were beginning to clear before my eyes, I saw Novak looking down at me anxiously.

"Where are we?" I managed to gasp.

Novak admonished me to lie quietly for a few moments.

My eyes wandered about and I noticed I was in a fairly large bed. The room was small and furnished in an unimaginative fashion which was depressing. There were no splashes of color, no attempts at beauty in the room. Everything was in a low monotonous brown hue. The ceiling was low, being barely six feet I judged, and the whole room seemed to be swaying gently.

A dim blue light which seemed to be the room's sole illumination exuded from the ceiling, though not localized at any definite point. The floor had a fluffy covering, not unlike cotton in its natural state, which was in the prevailing shade of brown.

Novak's voice as he talked had a strained quality which I attributed to the evident sound proof qualities that had been used in the construction of the room. I focused my wandering thoughts on what he was saying:

"—after I screamed I felt something on my face. Then I lost consciousness and when I awoke I was lying on that bed with you.

"Once after I regained consciousness I saw a section of the wall slide back and some kind of a robot entered the room. Somewhat on the type of Eros and those other Robots exhibited at Haddon Hall not long ago. It left food here and later returned with a bottle of something that tasted like some kind of brandy. I forced some of the liquid down your throat. You revived—and here we are."

"But how long have we been here?" I inquired weakly.

"I regained consciousness several hours ago but of course I do not know how long I remained unconscious," Novak replied.

"What are we going to do?" I asked impatiently. "For all we know we may be headed toward the bottom of the ocean."

"You have diagnosed our course better than you think," Novak smiled grimly. "See what I discovered a while ago."

Approaching the far wall he pressed a button invisible to me. The wall slid back revealing an outer transparent wall such as those used in the submarines of the Paldron Institute sub-sea research department.

I managed to stagger over and press my

forehead against this wall. The water was flashing by on the outside and showed that we must be traveling at a high rate of speed. How high I had no means of calculating.

Afraid to believe what I could plainly see, I retorted: "Nonsense, perhaps we are just below the water line."

"No, you saw it when it rose out of the water" Novak replied quietly. "It is undoubtedly a submersible of some kind. Then, too, there have been several times when I could plainly tell that we were descending at a sharp angle."

"But what's it all about?" I asked desperately.

"The Lord only knows, but we have certainly bumped into something we are entirely unacquainted with or prepared for."

We continued to thrash about conversationally in search of a satisfactory theory for our situation when suddenly a low sound warned us we were no longer alone. Turning I surveyed the man who had entered.

IN stature he was short almost to the point of being a dwarf. His legs were almost ridiculously small and undeveloped. His hands, too, were abnormally small as was his torso.

His head attracted my attention. It was enormous in comparison with the rest of his body. His broad forehead sloped back to a head which was entirely without hair. A pair of extraordinarily large and brilliant eyes gazed at us. The entire impression I gained was that of a super-normal intellect.

Motioning with a withered and shrunken hand for us to follow he turned to leave the room. I stood irresolute until Novak set the example. I seemed to look to him instinctively for guidance. When he took the initial step toward the aperture I followed.

We walked down a low hall which was barely wide enough for our passage, even single file. The ceiling of this hall was even lower than that in the room we had just left.

Thus we walked until we came to an ob-

struction. Then our silent guide pulled a lever which operated a portcullis-like arrangement. As it dropped behind us we heard a sigh not unlike that caused by the escape of highly compressed air.

Next we passed through a group of small rooms, evidently used for passenger-cabins and store rooms. Finally we emerged into what must have been the central room of the vessel.

The room was large, in fact much larger than you expect to find on a ship of any kind. It was brilliantly lighted, also. The light was the same blue as that in our room but emanated from two tubular rods fixed to the ceiling by metal clamps. The light streamed down revealing in pitiless detail every object in the room.

Thirty or more of the strange-looking men were seated in a row of chairs arranged horseshoe fashion. In the hollow of the semi-circle were two vacant chairs. The old man who had acted as our guide motioned us to be seated in them.

We sank down into deep cushions, side by side, our elbows touching, and waited for the next step in this strange drama.

CHAPTER IV

The Council

GLANCING about I noticed with a shudder of apprehension that every countenance in that room was the same! The faces of our captors were so identical that they might have been cast from the same mold.

I had no time to speculate on that, though, as one of the queer creatures advanced toward Novak and myself and began adjusting helmet-like arrangements on our heads.

These helmets were fitted with electrodes and mouthpieces and were attached to a complicated looking machine in the center of the room by wires. One of our captors stationed himself at this machine.

A distinct click sounded through the room and then a metallic sounding voice began to speak:

"I would advise you to sit still and listen quietly. You are in no immediate danger."

Then the voice continued:

"You are probably interested most in where you are. This is a vessel from Daar, the sunken city. It is the first ship sent from the lower world to the surface of the sea in search of Borite."

Novak interrupted with a question to which the voice replied:

"Borite is known to your world as a chemical element, in ours it is called a primary."

Again Novak made a query to which the reply was:

"The atomic weight of Borite is 55.84."

"That is what we know as iron", Novak exclaimed.

I thought of the *Marovia* and its missing metal lining.

"May I ask what you want with Borite?" Novak continued.

"For use in a vibratory heat ray which when properly handled is a powerful weapon of warfare," the voice replied.

We were to learn more about that ray within a short time!

The voice continued and next launched into a brief history of Daar, the city to which we were being taken, and its inhabitants.

Later we learned that the method of communication between our captors and ourselves was an intricate arrangement for the transfer of thoughts. They were not actually speaking to us at all. The apparatus made it possible for any one in the room to consciously send a thought to or receive a thought from any one else in the room.

Unusual facts about Daar were related by the "spokesman" during the remainder of the council. We learned that the city had once existed above sea level on a continent not unlike those of the world from which Novak and I came.

The race inhabiting Daar was the supreme one of the continent. Then a series of earthquakes began crumbling the earth and as the cataclysms increased in intensity it became apparent that Daar was slowly sinking into the sea.

Scientists of the city devoted their skill to the problem of saving the race. To have constructed enough boats to save the population would have required years whereas

the most optimistic calculations gave the city but a few more weeks of existence.

A scheme of salvation was perfected by Dobeer, one of the nation's most learned scientists. The result was the erection of an anti-gravitational machine which nullified the weight of the ocean. Thus as the supposedly doomed city slowly sunk beneath the waves of the ocean it was encased in walls of weightless water.

So Daar became a mighty city located on dry land beneath the sea. Isolated from communication with other worlds the Daarians devoted themselves to the study of science with amazing results.

Waste materials such as are discarded in our world were utilized to the fullest possible extent. Synthetic food was but one of the marvels of everyday life. Atomic energy also was utilized in many ways to aid in supporting life in the city.

Those were the salient facts imparted to us during that queer "conversation" in the council hall of our captors. It appeared that the meeting had been called more for the purpose of supplying us with information than to obtain any information from us.

After the meeting Metoor, one of the councillors, was assigned to us as a guide and in succeeding days took us on inspection trips to various parts of the submersible.

The engine room was the most unbelievable feature of the ship to me. I had pictured it to myself as being filled with massive machinery. My surprise was complete therefore when I found that its most prominent feature was a small circular table which stood on three legs in the center of the room.

A large globe surmounted this table. This globe was surrounded by smaller ones which glowed alternately in weird fashion and rising from the cluster of globes was a long, slender tube. This tube emitted the high pitched whine we had heard so often. The display of colors and dynamic force given off by this delicate apparatus caused the room to resemble a scientific laboratory more than the power room of a vessel.

"Surely that tube doesn't furnish the power which drives this ship," I exclaimed.

"But it does," Metoor responded, "an infinitesimal sliver of steel is in that tube. When the atoms in the steel are broken up, intra-atomic energy is produced which furnishes the propelling power for the ship."

HOW do you release that power?" Novak asked.

Our guide explained:

"The steel is held in the middle of the tube by two clamps. A current of electricity of a high potential passes through it projecting a stream of electrons from the bottom of the tube to the vibratory ray which bombards the electrons of the steel atoms. The balance is thus disrupted and the proton released. Stores of energy attaining titanic proportions are thus available."

Another question of Novak's was in regard to the method of controlling the vertical and horizontal movements of the vessel.

Metoor replied:

"That is accomplished by means of a weight reducing and increasing machine. In other words an invention similar to the anti-gravitational machine you have heard about. By increasing the weight of the ship we are able to sink and also to withstand the terrific pressure of the lower ocean depths.

"By the opposite use of the machine we can decrease weight. In fact we can lighten the vessel until it actually weighs less than the atmosphere. That is what we have to do when we emerge from the water and enter our own city."

We passed through the other parts of the ship in rapid succession. The living quarters of the councillors were at the back of the ship. There were storerooms there, also, in which we saw piles of steel trimmings.

Looking at those mute reminders of the terrible catastrophes on top of the sea I wondered what lay ahead of us in Daar.

Daar

HAVING no means for calculating time I do not know how long our journey in the submersible lasted.

One day Metoor summoned Novak and me

to the council chamber and pushing back a panel in the wall said:

"Look!"

We were floating above a large city.

As we gazed in astonished awe Metoor said:

"The city of Daar."

Our craft landed in much the same manner a huge dirigible is brought down. It was anchored on the flat roof of a large building with the manual labor being performed by robots who were almost human in appearance. The mechanism operating them must have been almost perfect.

The scene was one of bustling activity. Metoor remained by our sides until landing operations were completed and then led us from the machine.

"There will be a meeting of the councillors this afternoon which you will attend", he told us.

Until that time we were left more or less to our own devices with one of the councillors acting as a guide, or, as we suspected, as guard.

A superficial survey of Daar revealed that it was laid out in accordance with the radial plan of city building in the upper world. The buildings were practically uniform in size and were arranged so that they led toward a square or park which appeared to be a public meeting place of some kind.

Architecturally the buildings tended toward the massive and utilitarian style. Each was surmounted by a tall, gray spire which in turn supported a glittering globe. These domes pointed toward the dim wall above, which we knew to be the ocean wall.

In the center of the square or park, where the buildings terminated, there was a tall fence surrounding a spire larger than any in the city. This building housed the anti-gravitational apparatus, we later learned.

Anti-gravitational emanations from that tall spire held the ocean back and insured the safety of the city.

Despite the oddities of the city Novak and I were concentrating more on thoughts of the council meeting than on the strange sights surrounding us. We felt that our fate probably depended on that meeting. At the very least we hoped to discover some

clue as to the reason for our capture and transportation to Daar.

Impatiently, therefore, we waited for the summons which came in due time calling us to the meeting. In the council chamber we found a large group of men awaiting us who were identical in appearance to those we had seen on the submersible.

Metoor was the spokesman for the group and after our headpieces had been adjusted he plunged immediately into the subject.

"We are facing a grave national crisis," he began, "the Borite we have obtained is insufficient for our purpose. We want you to guide us to a spot on the surface of the sea where we can be sure of obtaining more."

Novak spoke for us and in a series of discreet questions discovered that the Daarians were badly disappointed in the small amount of iron obtained from the ship they had destroyed. They had hoped to obtain much greater quantities of the valuable substance.

Naturally we were not inclined to league ourselves with these strange creatures against our own people, so we disclaimed any knowledge of where they might be sure of obtaining greater quantities of steel.

The councillors were quite frank in outlining their needs to us. They seemed to consider us harmless in hurting their enterprise. We discovered that a struggle for supremacy was in process between two opposing factions in the sub-sea metropolis.

The group with whom we were perforce allied were the hereditary rulers of Daar. Although they numbered only 250 in a population of about 20,000 persons they had held undisputed sway until a short time before. Their commands were enforced by thousands of robots created by the councillors and capable of carrying out any instructions they were given.

We learned that celibacy was maintained among the councillors and that their number remained the same always. All of them were bred from an artificially fertilized female who was selected every 25 years from among the masses. That explained their standardization in face and form.

The general population, known as "the masses," had submitted to this dictatorship

until a short time before when threats of an uprising began to spread. The masses, it seemed, were tired of their life of servitude and planned to overthrow the councillors, construct enough submersibles for the purpose and escape to the upper world.

This much we learned before being dismissed from the council. Metoor then informed us that guides would take us for a more extended tour of the city than we had yet enjoyed. We were told that we need have no fear in visiting the various parts of the city as the plans of the masses were as yet secret and supposedly unknown to the councillors.

Novak had characteristically decided that he preferred to see the scientific laboratories of Daar first while I wished to tour the city generally. As we waited for our guides we heard a sigh of compressed air that signaled the opening of a door leading to the elevator, or pneumatic-tube arrangement which connected the different buildings in Daar.

We turned in rather uninterested fashion and then it seemed for a moment that my heart stopped beating. The next moment it was racing, trip-hammer fashion.

IN the door, beside one of the men of Daar, stood Marna!

She stood transfixed with surprise, too.

Her jet black hair cascaded down and partially covered her white shoulders. Her blue eyes, which had a tinge of violet in them, were opened wide in astonishment and her lips were parted.

The tight-fitting white garment she wore accentuated the symmetrical lines of her figure. Indeed to my startled eyes she looked like the vision of a Greek statue come to life.

Then after a brief moment of amazement I stiffened and pretended not to know her. But with our eyes we spoke volumes, and only when the guide left us alone for a moment did we embrace, and seated Marna and I began a mutual explanation of what we knew about our situation and how we happened to be where we were.

Marna's story was much like mine. The *Times* boat on which she had been a passen-

ger had been attacked in much the same way Novak and I had been overcome on the *Marovia*.

The fearful rays had flashed over the boat spreading death and destruction. Marna lost consciousness and when she revived found herself among the strange crew on the Daarian boat. Apparently she was the only person on any of the attacked boats whose life had been spared. Why this was she did not know. But on the return trips the Daarian boat made to the surface of the sea no one else had been brought back except Novak and myself.

The men on the submersible had treated her with a respect and almost a homage that had led Marna to believe her capture was in accordance with some plan. But so far she had been able to learn nothing about the reason for her preservation at a time when all others were suffering a horrible death.

Marna had been accorded full freedom and whenever possible her slightest wish in Daar had been granted. As there was no possible chance for her escape she had gone wherever she wished. Natural curiosity had prompted her to thoroughly explore the peculiarities of the city. As a result she was almost as familiar with the city as the Daarians themselves.

In summoning her as one of her guides, Metoor had played what he thought would be a waggish trick by suddenly confronting us with one of our own race. How little he had guessed what that discovery meant to me!

Needless to say Atoor, the Daarian accompanying Marna, summarily became Novak's guide to the laboratories while Marna and I departed for a happy tour of the remainder of the city.

We bade Novak and Atoor a temporary good-bye as Marna led the way to a corner of the room where she pressed a hidden button. A door flew open revealing a tiny cushioned elevator. We entered and began our pleasurable trip together.

Marna took delight then and later in showing me her superior knowledge of the ways of Daar and we had many hearty laughs as she guided me about the city.

After entering the elevator Marna manipulated a lever. A light glowed at the top and I felt an almost sickening acceleration. The elevator came to a easy halt within a few minutes and stepping from it we found ourselves on a balcony overlooking a broad street.

The thoroughfare beneath us was paved with a hard looking white stone, which was similar to marble in appearance. Throngs of people were jostling each other about in the crowded street. I immediately noticed the lack of any type of vehicular traffic. Yet this was not such a strange situation when you considered that the city at its widest point was only six miles across.

Vehicles for transportation through the streets would have constituted a public nuisance due to the crowded condition of the city. Thinking of our traffic tangles in the upper world I could not help smiling and giving the Daarians another of those mental salutes I was getting in the habit of bestowing on them as I became better acquainted with their ideas.

We stood on the balcony a short time surveying the scene and listening to the snatches of inane conversation which floated up to us. The masses conversed together freely and only the councillors used the method of thought transference in place of using their voices.

In rapid succession we visited the places of importance in Daar. Marna gave descriptions of the points of interest and laughingly compared herself to the ballyhoo players of the rubber neck wagons in the big cities at home.

CHAPTER V

The Crisis

THE presence of Marna in Daar accelerated the half formed plans Novak and I had already made for our escape.

We attempted in frantic fashion to perfect a plan for eluding the councillors and leaving Daar. The impending crisis in the city served as a spur to our efforts.

But it seemed that we were caught in a trap from which there was no chance of escape.

"Our only hope is to gain control of the submersible some way," I told Novak one day.

"Easier said than done, I'm afraid," he responded, "how are you going to get by the guard?"

"That's what is worrying me," I replied.

A guard of heavily armed robots was on duty at all times. They were directed by a councillor who was always on guard with them. The councillors were afraid that the opposing faction might seek to gain control of the vessel.

An ominous calm seemed to be deepening over the city during those anxious days. The population went about its daily tasks as usual in the factories and laboratories of Daar.

But revolution was brewing secretly and the situation was becoming more acute every day, we learned from Metoor. The masses were merely biding their time waiting for the word from Monas, their leader, before striking.

The work of insulating the vibratory guns with which the councillors planned to repel an open attack was being hurried as rapidly as possible.

Novak and I were permitted a great deal of liberty and with Marna kept our eyes and ears open as we wandered about Daar. But in spite of our efforts we seemed no nearer a solution of our problem.

Metoor continued his friendly interest in us although we saw but little of him as he hurried from one conference to another and between times visited the factory where the heat ray guns were being prepared.

The masses had been kept in ignorance of the development of this ray and all the manual labor of insulation was being done by robots, who obeyed the mental impulses of the councillors in charge of the factory.

One day I gathered courage to ask Metoor a question:

"Metoor, why was Marna alone spared of all those aboard the vessels you destroyed in your search for Borite?"

He replied, almost carelessly: "We will use her instead of a woman from the masses when the time arrives next for replenishing our councillors. In that way we will show

the masses how unimportant they are to our welfare."

Concealing my agitation I made some noncommittal reply and thanked whatever instinct had warned me to tell Marna not to betray the fact that we were sweethearts. If the councillors had guessed that we were even acquainted in the upper world they would probably have imprisoned Marna or at least refused to let us spend so much time together.

Day by day the atmosphere seemed to grow more strained in Daar.

"Bob, I believe we could gain control of the submersible if we could get rid of the councillor who directs the guard," Novak said one day.

"That's right," I exclaimed as the full force of the idea struck me, "without the councillor the robots are helpless. They depend entirely on the mental directions given them."

"What's that?" Novak asked sharply as a shrill siren began sounding through the city.

Marna answered:

"That is a signal for the people to gather at the council hall."

Curious to discover the cause of the alarm we joined the throngs of Daarians who were hastening to the park-like enclosure about the council hall.

"By George, Monas has called this meeting, not the councillors," I exclaimed as we neared our destination.

It was the determined looking leader of the masses who stood on a balcony preparing to address the crowd.

"My people," he began in a thundering voice, "I have called you together to tell you of the villainous plans of the councillors."

An angry murmur rose from the crowd.

"We have just discovered their plans for exterminating the masses of Daar with a powerful heat ray gun. They plan to use the gun against us unless we continue to obey them," Monas continued. "Our only means of protection is to seize the factory where these guns are being made!"

The roar of the crowd was almost deafen-

ing as the Daarians signified their assent to the plan.

Then suddenly another voice was heard booming out above the noise of the crowd.

METOOR stood on an opposite balcony. "I warn you, people of Daar, that an attempt against the councillors will seal your doom," he shouted, "it is impossible for you to withstand the heat ray gun or seize the factory."

In a tremendous shout the people responded:

"Down with the councillors!"

Then the multitude took up the cry: "To the factory! To the factory!"

Suddenly Novak clutched my arm and hissed: "Look!"

A well aimed flame of blue was shooting through the air. It was directed from a window in the council hall. The brilliant scintillation speedily proved itself to be a deadly weapon and the hoarse clamor of the mob changed to shrieks of pain and fear.

As the terrible ray flashed through the crowd the odor of burning flesh rose to our nostrils in a horrible stench and charred corpses began to fall among the crowd.

Then as the ray was momentarily withdrawn, Monas again leaped to the balcony and cried in a loud voice.

"Oh Councillors, if we die you will perish also. For your own good listen to me."

Metoor from his place motioned Monas to proceed.

"We are not without a defense," Monas cried. "Even now our men have seized the anti-gravitational tower. If you turn the heat ray gun on us again we will plunge the whole city to destruction."

Excitedly I whispered to Novak:

"This is our chance. It is now or never."

He nodded and we began pushing a way through the crowd for Marna working to-

ward the flat topped building where the submersible was moored.

Then the very earth beneath us seemed to tremble. We hesitated and then heard a new shout of fear go up.

In the lull we heard Monas' frantic voice:

"Fly for your lives, the men at the tower have mistaken the signal and are loosing the waters upon Daar!"

With that terrible cry ringing in our ears we sped on. Icy blasts of air were sweeping about us and as we neared the machine drops of water like huge splashes of rain began to fall on us.

"Hurry," I panted.

Luck was with us for as we rounded the last corner we saw that only one councillor was on guard with the robots.

Slackening our pace Novak and I crept forward stealthily and then leaped. The councillor was taken unaware and struggled fiercely but we fought with the fury of desperation and soon felt his figure go limp in our grasp. The robots halted stupidly in their tracks unaware of what was taking place.

Then we heard the crashing of masonry and turning saw one of the largest buildings in Daar sway and then fall in an uproar of falling brick and stone.

Next we heard a mighty whistling sound, not unlike that of a tornado magnified many times.

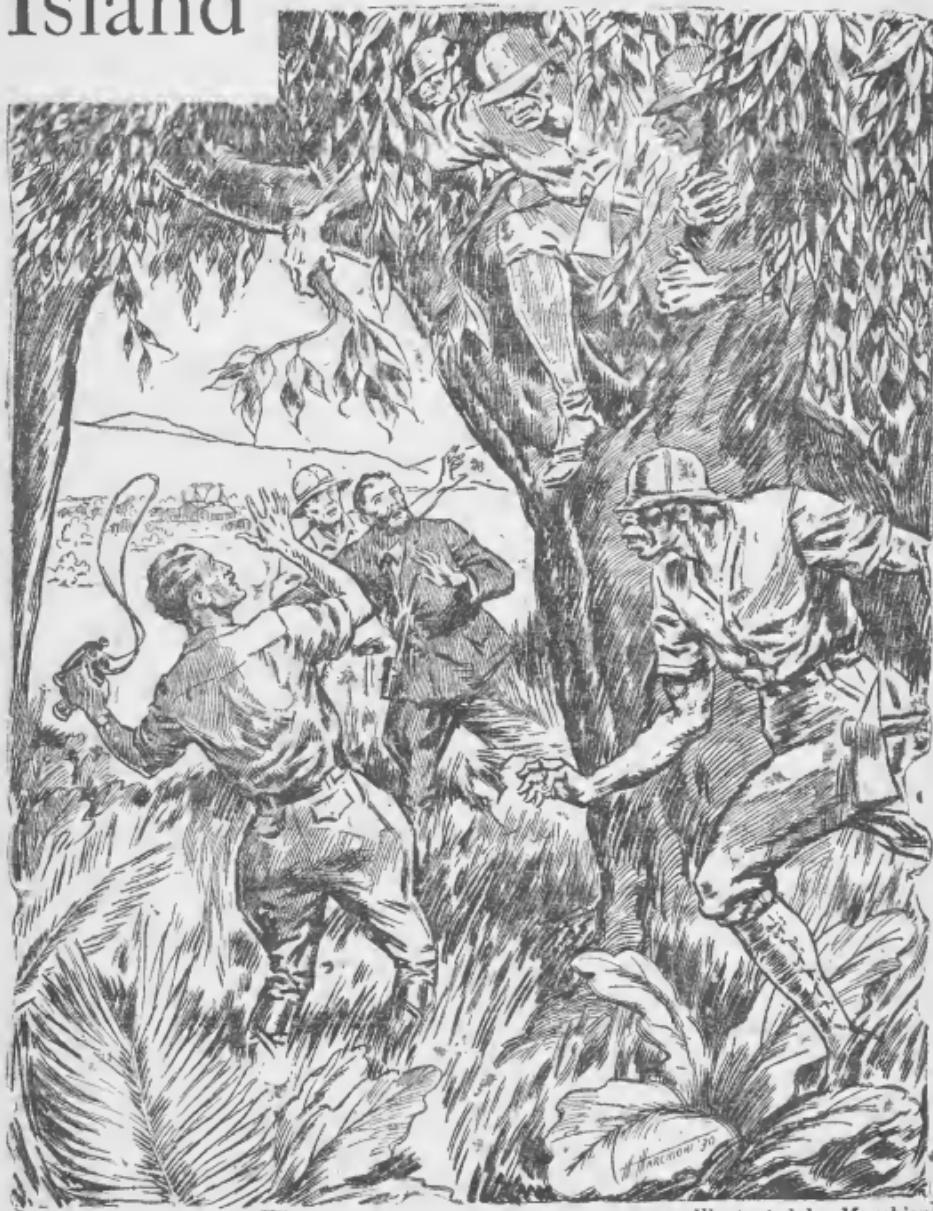
"The light in the tower is out," Novak screamed into my ear. I gave one fleeting glimpse and saw that the fiery ball in the anti-gravitational tower was dark.

Then I gathered Marna into my arms for the final dash to the door of the submersible. As we gained the security of the machine we heard the titanic roar of the falling ocean.

Novak swung a switch, the craft gave a terrifying wrench and then we could feel it shoot rapidly upward through the only free exit. We were leaving the doomed city!

The Gland Men of the Island

By Malcolm R. Afford



Illustrated by Marchionini

How long they sat there contemplating our movements will never be known, for as I sighted them they became galvanized into life

*An Army of Merciless, Inhuman Creatures were ready
... Under the Master's hand they armed for
action ... then Nature entered the play ...*

TO many who read my account of our amazing adventure on the island of the Gland Men, it will serve as just another illustration of how devious is the path of science. It will illustrate also how, from the darkness that girds it round, terrible possibilities loom black and menacing, terrifying those daring enough to wander from the beaten track.

Another, and I fear greater section of my readers may harbour no such sentiments, labelling the whole as a tissue of preposterous lies, but to those who condemn me, I say this. Take the facts—meagre, garbled—as they appeared in the newspapers and attempt to account for them in any other way. There is only one answer. It is impossible.

The intimate details were far too terrifying and astounding to permit of the facts being published verbatim, and it was mainly due to the newspaper's reticence that something bordering on a world-wide panic was averted.

Doctor Bruce Clovelly, DD., F. R. C. S., will, of course, need no introduction, for his recent surgical triumphs in glanding have made his name almost a by-word, and it is with Guy Follansbee that we must concern ourselves. Follansbee, as I knew him in my days as laboratory assistant to the doctor—one of those singularly fortunate individuals who know exactly what they want and how to get it without offending a single soul—inclined to be cynical, yet straight as the proverbial string. He had inherited from his father an insatiable desire for adventure and an income that ran into I forget how many figures. Being a man of somewhat simple philosophy, he used the latter to appease the former.

It had taken our combined arguments, practised often and over long periods, to make the doctor even consider such a thing as recreation and I had experienced the hardest task of my life in getting him from his chambers in Gower Street, to which he

clung like Diogenes to his wooden cavern. Even after his actual transplanting on to his opulent friend's yacht, the *Silver Lady*, he took his enforced holiday like a small boy takes his medicine, but as the illimitable miles of sparkling water grew between our vessel and his stuffy chambers, he turned about to enjoy himself.

We were midway between the Solomons and Santa Cruz Islands when the queer affair began. The morning had been oppressively calm and Follansbee, the doctor and myself had taken the electric launch to examine the rock fauna that flourished so prolifically hereabouts. It was characteristic of the doctor that he could, when required, produce inexhaustible stores of unexpected knowledge on the most out-of-the-way subjects; and though I had never before heard him mention marine growths, here he was expounding in his most didactic maunder to his slightly amused companion.

Having little taste in such matters, I was reclining upon the collapsible canvas chair, smoking a cigarette, and occasionally dipping my hand into the water, in order to convince myself that it would not emerge dyed blue. Whether, rocked by the gentle motion of the boat, I fell into a semi-doze or whether the change swept down so quickly that its coming was unnoticed, I cannot say. But I remember that I suddenly jumped to my feet and called my companions' attention to the unpleasant condition of the weather.

In the east, the sun, flattened to a disc of unhealthy brown, was gradually giving way to a dense bank of cloud that rushed down with the rapidity of a drop curtain. The water had lost its turquoise hue and undulated in a long oily swell that was strangely suggestive of hidden power underneath. Everywhere a heavy, pall-like silence hung over the face of Nature, fraught with an indescribable sensation of impending danger. Now and again there sounded, very faint and far-off, a curious humming sob, as of

some gigantic beast in an agony of torture.

"Without the slightest intention of being a first class Jonah," it was Follansbee's first remark as he boarded the launch. "I should say that we were in for something extra in the way of dirty weather."

Doctor Clovelly shrugged his shoulders. "I should have expected something like this to happen," he said irritably. "We should have never left the yacht. What are our chances worth if it catches us in the open sea?"

The explorer snapped finger and thumb. "Just that," he said grimly. "The only thing possible is to cut for the nearest island. With the weather like this the storm may be on us in five minutes, but on the other hand it may hang off for hours." He swung the wheel as he spoke and the launch cut thru the swell with a curious sucking motion. "But the Lord help us," it was Follansbee speaking again, "if it brings typhoon in its wake."

I LEANED over the side and glanced at the approaching island. Through the haze, I discerned the woods that flanked the shining stretch of silver sand, unsullied by mark or impression, the thick vegetation that grew, tangled and luxuriant, down to the water's edge. Here was a tumble-down native hut, raising its battered head above the mass of tropic greenery, there a sturdy giant palm, the trunk hidden from view by

the enveloping folds of some flaming parasite. As we neared the beach, I saw that the land sloped sharply into rolling hill-locks, cut and serried by deep gullies whose black, forbidding extremities were lost beneath the shadow of the higher mountains.

I turned to our host. "Does it possess a name?" I queried.

He shook his head. "Probably one of the numerous islands that stud the Polynesia like stars in the Milky Way. They are here today and gone tomorrow, thrust up by some volcanic eruption, snuffed under the sea by a tidal wave or some similar under-sea disturbance."

"I sincerely hope that it remains stable during our occupation," I remarked. Then the launch grounded on the shore and I jumped out to aid Follansbee to beach it high and dry. This done, we took our first close look at the island, our enforced landing place.

As we stood on the clean fringe of sand, the hush of the elements was even more apparent. Not a leaf moved in the thick humid heat, not a bird flew or animal moved. It seemed as though all Nature was waiting breathlessly for the op-

ening of the cataclysm. But for the low rumble of the breakers, we might have trod another planet, some long dead world; and the thick sand, deadening our footsteps, gave us a peculiar disembodied sensation that was unpleasant in the extreme. It was Fol-

SCIENTISTS admit that we are now on the verge of great discoveries in biology. We are just learning what we human beings are and what the forces are that control us. Why are some men small and others tall; why are some witty, clever, strong and successful and others dull, stupid and apparently without purpose or energy in life? The answer of the biologist is: Glands—little reservoirs of strange fluids, the fluids that course through our blood and determine our destiny. This seems almost magical—that for example a few drops of an unknown fluid can determine a man's entire destiny. Yet it has been proved to be true.

What a world we will have then when we finally discover how to control these glands and make them do for us what we will! We may have a nation of supermen or a nation of strong, stupid, slavish servants. It will all depend on who controls the glands. The author of this exciting tale was a professor of medicine himself and his science is not only exact but his story most thrilling.

lansbee who broke the silence. "No good cooling our heels on this beach," he said. "Under the circumstances, I think it would be worth our while to do a little exploring. That track through the trees seems to suggest unlimited possibilities." He broke off and pointed to where a worn track wound its way through the undergrowth.

"At least," remarked the doctor, as we made our way toward it, "we cannot claim to be true Crusoes. Someone has used this path pretty frequently—and not so long ago, if we are to judge by its appearance."

"Animals?" I suggested.

"Much too narrow," interjected Follansbee. "Then again, the beasts have no object in coming here; there is no water to drink, nothing to eat and from my experience of animals, they generally shun the seabeach," he glanced at the dry rotted grass. "No, my sonny, that track was made by one thing only—a number of men walking in single file."

I looked blankly at the waste of matted undergrowth and stunted trees, "But where on earth did they go?" I asked.

"That," was the reply, "is what we are going to find out."

In single file we followed the circuitous path for over a mile, Follansbee leading, his grey eyes gleaming, the doctor next and I bringing up the rear. Through virgin greenery that walled us on either side, so thick that one seemed to be treading some matted corridor we went on; beneath wild and tangled growth through which the sickly light scarcely penetrated, over young lush leafage that overlay and half disguised the dank rottenness of the older vegetation, through which loathsome creeping things scuttled as we approached, things hideous and detestable to look upon.

The last portion of our journey was terrible. Here a fair-sized stream had become

bogged by matted reeds and the spread of water was rapidly turning the surrounding country into a poisonous swamp. Clouds of insects hung over the black evil-smelling pools, some huge as wasps, with bodies of every conceivable hue and blend, some whose sting was death, others bred in the fever areas, carrying with them their dread legacy. The sibilant hum was discernible quite a distance away, and it sounded eerily out of place in that region of silence and decay.

Suddenly, with the abruptness that was almost startling, the forest ended and we saw ahead of us a flat plain. We were just about to step out on to the wide clearing,

when Follansbee, who was leading, uttered a cry of amazement, stiffened and stood stock still. He was staring at some scene below him on the plain, and as we approached, he turned and finger on lip, pointed. Stepping quietly, we drew alongside him and I choked down the gasp that rose in my throat.

We were looking on a wide barren area of land, in the centre of which was a cluster of iron buildings. That they were tenanted was obvious by the thin trail of



MALCOLM R. AFFORD

smoke that curled its way from the chimneys. One edifice, slightly isolated from the rest, was surrounded by a high wooden stockade, pierced at intervals by loopholes.

The Creatures of the Island

AS we watched, thunderstruck by our discovery, from one side of the stockade came a troupe of figures. There seemed no doubt that they were men, but such men as I have never before set eyes upon. They were of enormous stature, most of them being over eight feet in height. They moved with a peculiar lumbering gait, that was vaguely suggestive of something that I could

not place. Their arms, swinging at their sides seemed absurdly out of proportion to their bodies, and the great hands clasped tightly upon an object that, at the distance looked like an axe.

Each wore a kind of khaki shirt and breeches, with leather leggings that reached from instep to knee. A sun helmet took the place of a hat and as one turned away from us, I noticed a peculiar irregular blotch upon the back of the shirt. At first, I took this to be some personal damage, but a further glance showed me that each wore a similar adornment. At the distance, however, it was impossible to distinguish the outline.

"By Gad," exclaimed Follansbee, as he unslung his glasses. "We seem to have stumbled on a modern Brobdingnag. Thank Heaven for that storm."

The Doctor was already examining the monsters, so after a scrutiny, the explorer passed his glasses to me. I adjusted the powerful lens to my sight, and the approaching creatures leapt into my field of vision.

If, at a distance, these creatures looked unprepossessing, they seemed doubly so at close quarters. The lens picked out every detail with horrifying clearness, the broad, hunched shoulders, the long muscular arms, covered with coarse black hair, the slouching movement, caused, I now perceived, by the ridiculously short bandy legs. As one stopped to converse with his neighbour, he turned and the ragged blotch on his shirt took definite shape. I started again, thinking that my eyes were playing me tricks.

The shape was that of a five-clawed dragon, reared in the act of striking. It was either stamped or sewn on in black cloth.

But it was the features that drew the eye and held it in sheer horror, so hideously repulsive were they. The tiny head, with its wide slobbering mouth, the wicked red eyes and the flat coarse nostrils inspired one with a thrill of disgust and loathing. The low receding forehead and the forward position of the ears showed that, were they humans, they were of a very low scale of civilization.

"My God!" I heard Clovelly gasp. "Are they man or beast?"

I opened my mouth to answer, when from behind there came a rustle of disturbed undergrowth. I swung around, but there was nothing to account for the sound, when, acting on some unknown impulse, I glanced up into the tangle of branches above. A cry of horror burst from my lips, for there above us, silent and motionless as the surrounding forest, crouched four of those hideous creatures that we had been watching. How long they had sat there, their blood-shot eyes contemplating our movements, will never be known, for as I sighted them, they became galvanized into life. With guttural screams they sprang upon us, and I was just about to run for my life, when one gathered me beneath his arm like a bundle of hay, and, with a curious wabbling stride, made for the walled-in building.

CHAPTER II

A Place of Terror

IN an incredibly short space of time, we had reached the high partition. Here the creatures paused and shouting something in the guttural tongue, pointed to the gate, then to his companions in the rear. In my awkward position, I was unable to glimpse the one to whom he spoke, but it was obviously the guardian of the portal, for even as I screwed my neck to breaking point, the obstacle swung back, and we passed through.

I judged, by the stamp of the feet behind, that my colleagues were likewise captives, and by the sounds of struggle, that they were not submitting so tamely as I. Perhaps I was unfortunate in possessing a particularly irascible gaoler, for my puny efforts at escape had resulted in nothing more than a cuff across the face that nearly took my head off. Maybe it was just a gentle reminder that he would stand for no nonsense, but it served to quiet me beyond further resistance.

We traversed a slight dip and breasting the slope, came to the main residence. It

was much more pretentious than the out-buildings, with neatly laid paths and flowerbeds, though the blooms could not be called healthy. Across the roof were looped slender wires, standing clear against the coppery sky, terminating in twin aerial poles. It strengthened my conviction that we had reached the headquarters of this amazing island.

Four wooden steps led us into a wide hallway, carpeted with rush mats, that strewed the floor at regular intervals. A number of doors, dimly discernible in the uncertain light, opened off this passage, whose extremity was lost in the prevailing gloom.

It was here that my guard at last set me down and turning, signed to his companions to do likewise. I smoothed my rumpled apparel into something approaching order and turning, beheld Follansbee, as imperturbable as ever, in the act of lighting a cigarette. Clovelly, seemed still stunned with amazement and he looked at me with eyes that hinted a thousand questions.

Before he had time to utter a word, one of the creatures wheeled around and disappeared into one of the rooms. As he opened the door, I became aware of a peculiar odor—sweet, sickly—that emanated from behind it. For just a second it eluded me, then as it grew stronger, I recognized it immediately—chloroform.

I glanced at Clovelly, and smiled wryly. He was sniffing the air like a thoroughbred, his professional instincts aroused. I noticed the slender white fingers quiver like the antennae of some giant insect, itching for the scalpel or the forceps.

Seeing my interest, he opened his mouth to speak, but what he meant to say will never be known. Suddenly, tearing jaggedly across the stillness, there came a horrifying shriek of some poor soul in mortal agony. Higher and higher it rose, in shrill cadence, then at the highest note it ceased abruptly, to die away in a gurgling mumble, then silence—thick—enveloping—sinister—

I am not easily frightened, but an icy horror gripped my heart. Clovelly was white to the lips and even Follansbee was shaken out of his customary equanimity. Our huge guardians seemed absolutely unmoved by

the horrid experience, not an emotion was discernable upon their animal countenances, they were as devoid of expression as a rubber doll.

At that moment the door re-opened and our guide appeared. Taking advantage of the diversion, I crossed to the half open door and essayed to peep inside. I was almost there when one of the creatures sprang forward and with an angry grunt, grasped my arm and with such force that I cried out. Our huge guide turned quickly and looking questioningly at his subordinate (as I took the other to be) fired a volley of unintelligible jargon at him. Suddenly the creature released me as though I had become red-hot and a look of something akin to deference crossed the bestial face. But I hardly noticed this, for my head was buzzing with a new discovery. The opening and shutting of the door had afforded me a momentary glimpse beyond—a fleeting vision of a modern operating theatre, the tables, instruments and assistants showing spotlessly clean in the bright artificial light.

One of the creatures crossed to a portion of the wall opposite the door and pressing on it, moved his hands in a curious circular manner.

The reason for this was plainly obvious the next moment, for there came the sound of a metallic click and a section of the wall swung back to reveal a door, set flush in the woodwork. With more haste than ceremony, we were thrust through this door, it clicked behind us—and for the first time since our capture, we were left alone.

BUT we had no desire to converse. We were struck silent by the extraordinary appearance of the singular apartment in which we found ourselves. I can close my eyes now, and recall every feature of that bizarre apartment as though it were yesterday, so indelibly are the details engraven on my mind.

It was circular in shape and lined with books from floor to ceiling, the reds and golds of the bindings reflecting the light from the mosaic shaded lamp that hung in the center of the room. Beneath this was a huge bowl of roses, the colours shading

from one extreme to the other. Some there were so dark as to appear almost black, to vivid scarlet and flaming yellow, to others so delicately tinted as to truly rival the shy blush of the maiden. They filled the room with a heavy, exotic perfume and as I gazed, one of the flowers, fullblown in that superheated atmosphere, burst slowly and the creamy petals drifted slowly—one by one—lightly as thistledown—onto the rich red carpet on the floor.

Behind this great bouquet was a square block of perfectly grained black marble, flanked on either side by fantastically wrought incense burners. Poised on the marble base was a five-clawed dragon, in the act of striking, carved from solid ivory with the meticulous care that characterizes the oriental artist. So cleverly was it wrought that the object seemed to possess a personality that was both fascinating, yet repellent. It was wickedly beautiful in its own way, and it recalled to me similar emotions when I had first handled a Renaissance stiletto.

Directly opposite the carving, the books ended abruptly, to recommence at an interval of about three feet wide. Across the aperture was hung a heavy plush curtain, crimson with golden edging, and worked with poppies and roses. It fell in heavy folds that hung motionless in the still air, exuding an influence of the obscene and the unmentionable.

I turned and something caused me to rub my eyes. Of the door we had entered, there was no sign. Save for the curtained aperture, the book-lined walls continued in an unbroken line around the room. Hardly able to believe the evidence of my own eyes, I walked up and ran my fingers over them. My hand encountered bindings—red—gold—that winked mockingly in the vari-coloured radiance.

The choice of books in themselves was remarkable. The titles covered a wide range from the transcendental and metaphysical and all manner of works on the processes and oddities of the human thought seemed to be assembled there. They ranged from the days of black magic to psychotherapy of the modern analytical school.

There were volumes by Zaasman and Jung, together with other foreign scientists on the morbid phenomena of the brain.

Interested in spite of myself, I took down one book in German, a tongue with which I am fairly conversant, but after a hurried glance returned it hastily to its position.

It was a study of Dementia Praecox and its plates of naked German lunatics almost turned my stomach, quite unused as I was to the German scientific treatment of the more repellent disorders of life.

At the end of the highest row were a number of volumes touching on the influence of suggestion on the human mind. They ranged from the early investigations of Bertrand and of James Braid to the more recent studies of auto-suggestion by Coue and other modern French writers in this line of thought.

"By Jove, Follansbee," the doctor's softly spoken remark brought me round like a shot. "You wanted adventure, you craved something different—well, you've got it, with a vengeance."

A Narrow Escape

THE big explorer shrugged his shoulders. "There are more things in Heaven and Earth, my dear Horatio—," he quoted. "We seem to have stumbled fairly into the latest six shilling sensationalism." He glanced at the watch on his wrist, "By the Lord Harry, it's almost ten o'clock. I could tackle the proverbial leg of an iron pot, I'm that peckish. I sincerely hope someone puts in an appearance shortly," he broke off and glanced round the room. "Who owns this musical comedy apartment, anyway?"

The doctor paced the room, his hands locked behind his back. "Do you know," he said, as he drew abreast of us, "I rather fancy that we are on the eve of a momentous discovery. Taking the curious events in their sequence, we have the finding of the Islands, the well-worn path through the woods of an apparently uninhabited island and our discovery of the giant creatures that eventually captured us. Add to that the fact that there is installed here something in the

form of an operating theatre—so much is plain by the use of chloroform—and we are left to arrive at only one conclusion."

"Why," I broke in, "Behind that door from whence the ether fumes emanated, is an operating theatre, up-to-date and modern in every respect. Though I caught just a glimpse as the door opened, I recognized the Newington naphtha flares, and they have yet to be installed in the Prince's Hospital. Evidently, whoever uses the room insists on every known appliance."

Clovelly nodded absently. "Exactly. It bears out my theory that before we leave this island, we are going to learn that science, in the hands of the unscrupulous, can do quite so much harm as it can do good." He turned to me, "You, Huxley, with your medical knowledge, can you not glimpse at what is taking place here?"

I shook my head and coloured slightly. "I can perceive nothing more than is apparent to all of us. In some manner, the ruler or owner of this island has possessed himself of some secret formula for the making of super-men. This he does by some delicate operation, for the elaborately equipped operating room and the modern Blood Filter are both necessary in the course of the metamorphosis."

"And have you no idea of how this transformation is effected?"

"Not the slightest, but I know enough to be aware that he has a tremendous power for good or ill. Just how he intends to use it is a matter for conjecture."

The doctor turned to Follansbee, but that gentleman was gazing intently at the curtained-off aperture. He closed his eyes tight and shook his head. "Either I'm going clean blind batty or my eyes have developed the shakes, but I'm certain that I saw that curtain move. I was just standing here when—look, there now, do you see it?" he broke off abruptly and pointed a finger at the gentle moving cloth.

We stared as if fascinated at the slowly writhing folds, as it twisted and coiled itself into thick pleats, to belly out like a sail in the sea breeze and then resolve into tiny undulations that rippled across the crimson surface. But the culmination came when

from behind it there arose a peculiar coughing grunt, followed by a gasp of someone or something struggling for breath.

"What fresh deviltry is this?" muttered the explorer uneasily. He raised his voice. "Anyone there?" he called.

There was no answer, but I for one was hardly surprised. It was not enough for Follansbee, though. He squared his broad shoulders and clenched his fists. "I say," he called again, "is anyone there behind that curtain?"

But the silence of the weird circular chamber was unbroken. The curtains were motionless now. Another rose bloom, a flower almost dead black, fell to pieces. Almost mechanically, I counted the falling petals—one—two—three.

The big watcher paused just one second, then with chin jutting ominously, he strode toward the aperture. I could not but admire the stark courage of the man, facing unarmed a danger, increased a thousand-fold because of its indefinable quality. Though my heart beat suspiciously fast, I stepped up beside him and we were almost to the curtain when an unlooked-for contingency occurred.

"I would advise you, gentlemen, to leave things that do not concern you, untouched. The consequences of spying are sometimes painful in the extreme."

THE voice was suave and modulated, but it possessed the quality of a revolver shot, it could not have startled us more. We whirled as if stung and gazed with wide eyes at the author.

He was standing a little in rear of Dr. Clovelly, and his manner of entry was a matter for conjecture. Certainly none of us had heard him, but as he was standing where I presumed the secret entrance to be situated, I judged that he had achieved ingress in like manner.

It needed only a second's scrutiny to place the man as an Oriental, but he was clothed in a neat fitting grey suit and shod with smart, square-toed patent shoes. His skin was smooth and butter-yellow and a pair of large tortoise-shell glasses bridge his nose, the huge pebbles making the eyes absurdly

out of proportion with the rest of the countenance. He wore his hair long and brushed back off a high intellectual forehead. He spoke with just a slightest trace of accent, a metallic emunciation of the consonant "r"—a trait which characterises even the most educated of Chinamen.

"I trust, gentlemen, that you will excuse the somewhat rough handling. Strangers are not welcome on the island of Ho Ming, especially white strangers."

As the insolent voice ceased, a thin ironical smile curved the thin lips, revealing two rows of yellow teeth. But there was no humour in the narrow-lidded, purple-black eyes, for in their inky depths there lurked the cruel passionless look of one who had gazed too long on agony and suffering to feel the sorrow and pity of it all. They reminded me of the loathsome orbs of a hooded cobra.

Follansbee was first to recover from his surprise. "If we are not asking too much," he asked quietly, "May I enquire just where we are and what relation you bear to all this," he waved his hand around the bizarre apartment.

With all the slow dignity of his race, the Chinaman raised his hand. "I will explain in my own time," he said blandly. "It is I who give orders now and you will obey—" He smiled at the angry Follansbee—"No! Then steps will be taken to make you obey. We of Hankow have many methods of curing obstinacy."

Dr. Clovelly started forward. "We are British subjects," he cried. "If you harm us in any manner, the government will blow your island to Glory and you will end your career with a rope around your neck."

The Chinaman bowed and spread his hands. "If it eases you to entertain such delusions, Dr. Clovelly, by all means do so. But you have evidently forgotten the necessity of communicating your unfortunate position to your Government."

"How do you know my name?"

"I know many things, for I am the chosen ruler of the People of the Ming Dragon. You have arrived at a most opportune moment—" the Oriental broke off abruptly—

"Gentleman, I have a proposition to put before you."

He walked over to the black marble dais and seated himself thereon. For a moment he sat thus, seeming deep in thought, then he raised his eyes and glanced at each of us in turn.

"Now," he began, "I want you to hold no delusions as to your position on this island. You are my prisoners, for me to do with you as I whim. But you are all men who have achieved some fame in your respective professions and I have no desire to rob the world of your talents. So—I offer this truce."

He turned in his seat and directed a long slender finger at the doctor. "I know you, Clovelly, as one of the greatest of living authorities on the gland-grafting treatment. Your studies with Steinach in Vienna, when you unearthed the Cod Bone method proved to me that you had the business of glanding and rejuvenation at your fingertips. Mr. James Huxley, your assistant, needs no introduction to me, nor does your friend, Mr. Follansbee.

"You have, no doubt, been rightfully bewildered over the strange creatures that inhabit this place, hesitating to categorise them as either man or beast. Let me set your mind at rest, and inform you that they are neither and yet both. That is to say, they possess the characteristics both animal and human, because they are of a scale of civilization that is intermediate. They eat, walk, talk and work, possess the strength of ten men, live to an almost prodigious age, and lastly, possess a certain immunity from sickness and disease. They are my Gland Men and are the latest triumph of modern science."

The monotonous tones ceased and the speaker, taking from his pocket an inlaid case, extracted a cigarette. I blinked my eyes and breathed hard, thoroughly convinced that I was mad or dreaming. The coloured shade stained the floor with its dancing hues, the rose-scented air seemed charged with the dominant personality of the owner. The scratch of a match recalled me and I saw the smoke curl through the nostrils of the Oriental, as he lay back and

surveyed us with his narrow oblique eyes lowered to mere slits.

CHAPTER III

A Gigantic Scheme

“NOW, gentlemen, behind this is a story of patience and attention to detail that can only be achieved by one in search of an ideal. Up on the slopes of the White Headed Mountain, on the Western border of Tibet, there stands a Lamasery known as the ‘Brothers of the Golden Khan’. It is the holy of holies, this desolate edifice, for in its sacred precincts there dwells the Most Illustrious Deity, the Grand Lama Dalai. He is a beautiful youth, with skin as soft as a maiden and limbs muscular and symmetrical. Though he has attained the distinguished age of two hundred years, he has the appearance of an unsullied youth, a fit spectacle for the thousands of devout Chinamen who yearly visited the shrine, leaving it richer by gifts and money.

“Now, my father entered that Lamasery as a youth, not because of any religious urgings, but because he regarded the permanent youth of their Deity to be nothing more than a gigantic hoax to attract money and notoriety to their shrine. He knew that the priests must possess some miraculous secret of preserving eternal youth and he meant to obtain that formula, cost what it may. That the task was no sinecure was obvious, but he had the patience and perseverance that only one of the East can inherit.

“For forty long years, my father lived with the priests, and he was just on the point of achieving his life’s desire, when he was betrayed by a treacherous servant. He was caught and after a year of endless torture eventually made his escape. He fled to Hankow, where I was studying surgery and delivered into my hands the sacred tomes containing the great secret formula. Further information I could not receive, for amongst other things, the Lama priests had torn my father’s tongue from his mouth, thus making him dumb forever.

“Then followed a reign of terror for us.

My father and I flew from place to place, but nowhere could we escape the watchful eye of the vengeful priests, who, by that time, had discovered the missing volumes. At length, I evolved a plan by which we would be free from further persecution. I personally sought an interview with the Great Emperor Dragon, the great Shem Sing, and laid my plans before him. He was delighted with the idea, and not only gave orders that I should be protected, but also agreed to finance the scheme in view.

“One of the chapters in the book dealt extensively with that branch of anatomy known as the Endocrine Glands. As you gentlemen are aware, this is but a newly discovered phase of surgery, but to the Holy Brothers, it had been old knowledge. There is nothing in this earth so strange and fantastic as the history of those obscure bodily organs that mean more than life to us.

“Amongst other things, the two most frequently mentioned were the thyroid, that shield-like gland astride our Adam’s apple and the pituitary, hanging from the base of our brain by a hollow stem. The pituitary controls our growth, but the thyroid controls everything that makes our life worth while.

“Children with deficient thyroids—from atrophy, removal or injury—become things horrible to look upon, glibbering idiotic dwarfs—heavy featured and twisted in body. Cretins they are called, for they never metamorphose into normal adults. Hence the importance of the obscure organ.

“But the Brethren experimented on aquatic larvae. They caught a tadpole and removed its thyroid. It never became a frog, but remained a tadpole for the remainder of its existence. On the other hand, they gorged a tadpole with thyroxin, and almost immediately it changed to a frog. I say changed, gentlemen, not grew—because the tadpole did not grow. The frog, fully developed, remained only as large as a tadpole. Thyroxin feeding produces two results, it hastens metamorphosis, but retards growth.

“With this information, my father and myself started out upon our momentous scheme. We obtained the thyroid from an

ape and transferred it to that of a three-months-old baby. Almost immediately the child began to exhibit simian characteristics—then the body began to alter shape. But the child grew no larger than the day the gland was transferred and it was to overcome this difficulty that we set ourselves.

"Now the growth, or pituitary gland is not a vital organ, but a normal gland is essential to normal life. An operation on the pituitary is enormously difficult—for one thing, it is only as big as the tip of the little finger and it is so near the centre of the head that it is next to impossible to localize. But we finally overcame this difficulty and all was ready for the final experiment.

"**T**HIS was the scheme in mind. If a grafted thyroid could transform a child to an ape, would it not be possible to transplant the glands of an anthropoid to that of a growing human? An operation on the pituitary would overcome the difference in growth and the finished product would possess the strength and power of an anthropoid and the intelligence and appearance of a human being.

"Such was the scheme that occurred to me. Luckily I was possessed of twelve sisters, and each, in turn gave their lives for science. Still we were unsuccessful, the creatures of our experiments being things hideous and fearful to look upon, that were killed as soon as tested. Then our faithful servants professed themselves willing to give their lives. Three there were and by a strange freak of Fate, it was the last attempt that was successful. We achieved a huge beast, such as you see here today, and it was this creature that we took to the Emperor as proof of our good faith. Then we outlined to him our momentous scheme.

"What a great thing it would be for our decadent empire could we but manufacture an army of these Gland Men. They would be immune from hurts and outlive the strongest of soldiers. Again, they would seek for nothing in return, fighting but to appease their brutal instincts. With an army such as these, we could wipe the entire White Race from the world and restore

China to her rightful position as Mistress of the World. The magnificence of the scheme fairly dazzled me, such prodigious possibilities did it possess.

"Here you see the great scheme in embryo. Thanks to the magnificent generosity of the Emperor, we have unlimited facilities for the great scheme in progress."

Once more he paused, and the hard black eyes, alight with the fire of fanaticism, gleamed and sparkled like wet anthracite coal. He leaned forward and waved a thin yellow hand in our direction.

"White men," he said, "Here is an undoubted truth. In a decade this colony will be a serious menace to your white civilization—and in fifty years we will sweep you off the earth. China will return to her rightful position, and the world will bow down to the despised Chinaman."

"Really," Follansbee's coolness was superb, "And if we whites are considered such a nonentity, why expound to such a length to us?"

The light died out of the Oriental's countenance and the eyes narrowed perceptibly. He inhaled deeply on his cigarette and as the smoke curled through the flat nostrils, the pungent odour hung in wisps on the heavily scented air.

"My Gland Men," he murmured, so softly that the purring voice was scarcely heard, "lack but two things. One—the method of human speech, and the other—of paramount importance—is their sexlessness. It is upon you gentlemen that I rely for the rectification of those surgical errors."

Dr. Clovelly took a step forward. "And if we refuse?"

The Oriental shrugged his shoulders. "I have just attended to two operations this morning," he replied meaningfully, "and in the advent of your refusal, I will attend three more tomorrow morning."

"Do you mean that you operate here?"

"Certainly. Why not? We have every facility of modern science, and a laboratory that is the last word in the up-to-date."

"But—but—" babbled Dr. Clovelly, amazedly, "Your supplies—and chemicals."

Ho Ming gave an upward gesture of his hands. "Wireless," he explained. "A call

to our base will bring a ship load of supplies within a few days. That is what has cut that path through the undergrowth."

"But your—er—patients do not recover immediately. You must have a hospital, or something of the kind?"

"If you consent to my proposition, Dr. Clovelly, I will make arrangements for you to be shown over my island as soon as it is possible."

C LOVELLY spread his hands helplessly. "Under the circumstances," he acquiesced, "we can do nothing but submit. But you must promise that we meet with no treachery."

The Chinaman inclined his head. "Have no fear of that," he assured us. "And now I shall show you around. You shall see that this is no wild dream of mine. It has taken years to accrue the knowledge and effects, but it is all to the one purpose."

With his quick, silent walk, he crossed over to the crimson curtain and pausing before it, spoke for some moments in the pure liquid Ho Man dialect. From inside there came a rustle of silken garments and suddenly, as we listened, there arose again that evil voiceless murmuring that we had heard on the previous occasion. Ho Ming turned to and waved a hand in the direction of the curtained aperture.

"My illustrious Father—The Great Bald One—The Learned Wong K'tai, who first wrested the priceless formula from the Lama pigs and to whose patience and saintly perseverance, this island owes its existence."

So that was the solution of the peculiar sounds, and I was about to pace forward, when Ho Ming, with a peculiar smile held out a restraining arm. He then picked up a slim ivory wand, and with a quick movement stabbed it at the curtain. Immediately there came a Szz and a bright flash as something shot through the air, but so quick—so unexpected—was the whole action that I did not have time to glimpse the object. The next moment the Chinaman, with a bland smile, moved forward and held aside the curtains.

The room into which we looked could

not have been more than six feet square, but screened on all sides as it was by rich hangings, it gave the illusion of depths that was very cleverly carried out. The black velvet hangings were worked with a bewildering array of birds and flowers, in colours both rare and wonderful. Scarlet parrots, blue peacocks were entwined with crimson poppies and roses of every shade and hue. Gaudy though it undoubtedly was, there was nothing in it to offend the eye, for the colours were blended with the skill of an expert.

In the center of the room, in a huge chair that almost enveloped the slight form, sat the oldest Chinaman I have ever set eyes on. He was thin to emaciation and the rich purple robe he wore hung in folds about his skinny frame. His head, bowed slightly with the weight of years, was as bald as an egg and the long beard that hung from his chin was white as the driven snow. The face was seamed with a thousand wrinkles and only the beady eyes, sunk deep in the lined countenance, gave a hint of vitality. He sat motionless, like some grotesque idol, a fit parent to this place of sinister secrets.

Ho Ming entered the room and pausing before the chair, fell upon his knees. For some moments, there was a silence, then slowly, like one in a trance, one claw-like hand, yellow as ivory, was raised in salute. For a second it remained poised, then, as though its owner lacked strength to hold it in place, it fell limply back onto the chair. Ho Ming rose to his feet.

"The great One salutes you, and wishes you well. Gentlemen, you may consider yourselves doubly honoured."

He re-crossed the room and as he made his way through the doorway, the curtain dropped behind him. Synonymous with it came the swish and the flash, and the Oriental with quick movement touched a portion of the woodwork. Immediately the object came to rest and for the first time we saw it. It was a blade, some six inches wide and the width of the doorway, a blade razoredged and weighted at the top. It ran down between the door-posts on a concealed wire, very much on the principle of the French device, the guillotine, at an almost

incredible speed. The Oriental released it, and it disappeared into a slot in the floor.

"Quite Chinese," he purred. "Borrowed from the palaces of the Emperors. By the way," he turned to Follansbee, "It was as well that I arrived when I did, this morning, for had you stepped across the threshold, you would have been cleft in half." He walked to the book-lined wall and moved his hands in the circular manner we had noticed before. With a click of concealed machinery, the section swung back, and we filed into the dimly lit passage. "Now," our guide cautioned us, "Keep close to me and offer no resistance, no matter what happens."

CHAPTER IV

Awaiting the Storm

THE contrast between the brightly lit room and the semi-darkness of the passage was so great that for some moments I could perceive nothing, far less distinguish any objects. The luminous dial of my watch told me that it was just past the noon hour and I could not but help reflecting that we had certainly spent a crowded hour. It seemed incredible that all our strange adventures had been compassed in such a short space of time; already we seemed to have spent months on the island, and England and Prince Alfred's Hospital seemed very far away.

Gradually, as my eyes became accustomed to the light, I made out the various doors leading from the strange apartment. The Oriental Ho Ming took the lead and we others trailed behind him. At the end of the passage he paused before a door.

"This," our guide explained with a gesture, "is the laboratory. Here it is that the serum is compounded that speeds up our workers and helps them to overcome the laziness that they inherit from the anthropoid side of their nature. Adrenin, obtained as you know, from the adrenals near the kidneys, forms a large percentage of the serum. Adrenin is the greatest and most natural stimulant known to mankind."

He threw open the door and we surveyed

a long low room, with wooden benches running the entire length. Upon these were placed a heterogeneous collection of scientific instruments—microscopes, galvanometers and centrifuges. Everything was scrupulously clean and three assistants in spotless overalls hovered silently about the room. Ho Ming gave a sharp order and immediately one of the men crossed to the bench and procured a test tube half-full of some dirty brown liquid. This he placed in his master's hand.

"This is the inoculation serum," explained the Chinaman. "You must understand that the ape-glands are incredibly strong and that if left to themselves, must ultimately reduce their owner to a state of bestial idiocy. To prevent this, an injection of the serum is necessary at least once a week. The result of the adrenin in the blood is at once apparent. It speeds up the sluggish heart beat, drives fatigue from the muscles, and prepares the body for emergency function. A very simple formula", he returned the tube to its place as he spoke, "I discovered it something like two years ago."

He closed the door and we retraced our steps along the passage. "Removal of the thyroids and parathyroids necessitates cutting away certain portions of the larynx" he was explaining to the doctor. We tried cutting through the windpipe into the cricoïd cartilage—" and he rambled away into the realms of surgery with Clovelly listening delighted and entranced.

I took advantage of his immersion to drop back with Follansbee. "What do you think of it all, anyway?" I muttered.

He surveyed me for a moment, his grey eyes lighted humorously. "Two things strike me with perturbing force. One is that our Oriental friend is a loyal fanatic and means every word he says. The other is that we are in the very devil of a hole and I don't mind telling you young fellow, that just at present, I fail to see the tiniest loophole of escape."

"Do you think the man is mad?" I murmured, having digested the somewhat disturbing statement of the other.

Follansbee shrugged his shoulders—"He

may be", he assented. "There is no doubt that he is clever—and cleverness and insanity often go hand in hand."

I glanced to where the two men were holding excited converse. "I do believe that Dr. Clovelly is really enjoying himself," I remarked softly. "He's hanging on to the Chinaman's words as though they were pearls of great price."

The other man smiled, a trifle grimly. "I think that the doctor will be quite safe," he returned. "It's little us that's worrying this child. You see, we may be guests of honor for as long as the childish vanity of our hosts continues, but one day, they'll run short of raw material, and then—" he made an expressive gesture.

I was about to reply, when the Chinaman paused with his hand on another door. He regarded us suspiciously as we walked up together and his voice was as sweet as honey as he observed.

"Do not linger behind, my friends," he glanced over his shoulder as he spoke. "There are many strange things in the abode of Ho Ming. Fingers that claw and grasp, hands that tear and break. It is very foolish to stray behind."

WITH that he pushed the door and as it swung open, we glimpsed a well-lighted apartment, with twin rows of beds running along either side. Around two of the nearest, white screens were placed and from behind one of these a faint moaning emanated. The air was charged with the acrid tang of carbolic and as before, everything spoke of scrupulous attention to detail.

"My hospital," it was explained. "My patients come here from the operating tables and from here they emerge to the out-buildings, to do their allotted share among their fellows. There is no intervening period, which we know as convalescence. A week in hospital is long enough for the newly grafted gland to function. Then sunlight, fresh air and hard work do the rest. It is amazingly simple."

"But," I interpolated, "Where do you get your material to work on? It must come rather hard to find men willing to sacrifice

themselves to this sort of Roman holiday."

"Convicts from the State Prisons furnish us with much work," was the cold reply. "Murderers, servants, and occasionally a few are pressed into service by my assistants, who form a modern equivalent to your old-time press-gang."

I grinned a trifle rudely. "Bang goes your dream of world revolution," I returned, "if that is how you progress. After weeding your prisons clear of undesirable characters the *magnum opus* will languish and finally die of insufficient means of support.

Ho Ming turned his unfathomable black eyes upon me. "Presumptuous fool," he said, coldly. "China now possesses an army of six thousand men, drilled and perfect in the art of war. As soon as circumstances will allow sufficient serum will be despatched and under the treatment of my assistants, every soldier will become a Gland Man. After that every man who enters the army will be likewise glanded, and in time we shall possess an entire army of these supermen."

I raised no more questions, for if the Oriental was insane, there was assuredly method in his madness. In fact the gigantic scheme was too complete, and for the first time, the true meaning of this man's insane dream chilled me with its appalling possibilities. The doctor's voice broke in on my reflections.

"And are all your operations successful?" he asked. "In such a delicate business as this, one would think the failures outweighed the successes."

Ho Ming looked at the speaker, his eyes alight with a peculiar gleam. "Yes," he said, slowly, "we do have failures, in spite of our precautions. Before you see them, I warn you—they are not pretty to look upon."

He led the way through a side door and we found ourselves once more in the day light. The weather had changed completely since our sojourn inside. The sky, brassey before, was now almost clear, the hard blue sullied by a thick band of black clouds that spread themselves like some ebon canopy across the eastern sky. Little puffs of

wind stirred the dust and dried leaves at our feet, whirling them into the blue. The atmosphere was thick and heavy, so heavy indeed, that some difficulty was experienced in breathing, and the sun poured down with a fierce heat that was almost unbearable. The silence was broken intermittently by a low sibilant hum.

Follansbee glanced curiously around him. "It's coming," he said appreciatively, "It's coming, and by Heaven, I pity this place if it strikes it."

We skirted the main building and passed through the high wooden stockade till we reached the outbuildings. Some little way further on, we could perceive a number of the queer inhabitants engaged in erecting a new structure. They swung the huge tree-trunks as though they were light sticks and in an amazingly short time, the central framework was raised.

We passed a long building, constructed of rough hewn timbers, containing a number of small cuhicles. Each separate room had its neatly folded mattress and shining eating utensils. The place contained no comforts whatever—just the bare necessities of living, and was obviously the domestic quarters of the strange beings that Ho Ming called his Gland Men.

The Revenge of Nature

Apeculiar smell was predominant here increasing in strength as we made our way onward. Everyone is familiar with the loathsome animal smell, that is prevalent wherever beasts are incarcerated. It emanated from a tiny hillock, built over an underground cellar. A gate led us down about a dozen steps cut in the earth and brought us up before a massive iron door, with a barred grating set in the top. The snapping and snarling of animals came clearly to our ears, and the words of the Oriental "they are not good to look upon" took on fresh significance.

The Chinaman, who was in the lead, stepped forward and sliding back the grating motioned me up. I peered in, scarcely knowing what to expect, and hardly had I taken one brief glimpse when I recoiled

was a gasp of horror. Even Dante, in his journey through the innermost Hells, could scarcely have viewed such horrible creatures as haunted that underground pit.

There must have been over a dozen of them—loathsome—terrible. Some twisted beyond any semblance of recognition, others with stunted bodies and bloated appendages growing on various parts of their anatomy. They stood silent as I glimpsed them, looking at me mildly with their blood-shot eyes, gesticulating with their crooked, shrunken limbs. But the crowning horror was the undeniable fact that once these things had been men, even as you and I, living—hating—breathing.

As I stumbled up the stairs, sick with horror, I was joined by the Oriental, who stood watching me with a sardonic smile on his lips. I did not speak, but stood there, drinking in the thick air in thirsty gulps. And then suddenly it happened.

It began by the sunlight fading, and glancing up, I saw that the monstrous black cloud had overshadowed almost all the sky, leaving only a portion over the sea, that glowed eerily with an uncanny elfin radiance. The low intermittent humming had risen in cadence and was coming nearer every second. A patter of feet made me swing round, and there, his face white with terror, was one of the overalled assistants. He stepped up to the Chinaman and poured forth a string of incoherent language, that for a moment, eluded even his countryman. Then I saw Ho Ming's face turn a sickly green, his eyes protruded, and he harked back a question into the other's face, and I distinctly heard the name K'tai. Then without a word, Ho Ming turned on his heel and, side by side, the two raced for the main building as fast as they could move, leaving me standing wide-eyed with amazement.

A moment later I was joined by my companions, and to them I explained the sudden departure of the Chinaman. As I spoke, several big drops of rain commenced to fall, and Dr. Clovelly glanced anxiously at the sky. "Hullo!" he ejaculated, "Here's that storm that you promised us, Follansbee."

But that gentleman jumped to his feet as though he had been stung. "Storm be damned," he exclaimed, "That 'storm' is a number one size typhoon, and it is heading this way. I give it five seconds to strike the island."

THE terrific upheaval of Nature lasted three hours, and to us adventurers, crouched in the groaning swaying forest, it was the final denouement of our astounding adventures on the Island of the Gland Men. Towards evening the hurricane dropped, but the rain poured down with unbridled fury, sweeping and lashing the vegetation before it. Such a deluge it is almost impossible to describe, rather it was as though the skies had opened and the seven seas poured their waters through the gap. Even in the thick of the matted vegetation, we were drenched to the skin, and it was almost dark when we eventually crawled forth from our shelter and took our last look at the Island. The downpour had abated somewhat, but it still swept in our faces with the sting of a whip-lash, and at length, wet, half-blinded and weighed down by the weight of our sodden garments, we gazed at what had once been the realization of a fanatic's dream.

Such a scene of destruction and chaos beggars description. The sturdy buildings had been swept away like match boxes before a summer breeze. The heaps of wood and iron were still faintly smouldering and when I remembered the volatile chemicals that were ranged along the shelves, I perceived that combustion must have wrecked quite as many of the edifices as the howling typhoon.

There was the half-erected framework, now splintered and scattered. There too, the poor dumb beasts that had once been men. The cataclysm had burst upon them before their bestial minds had time to realize its significance. The rain swept mercilessly down on the inanimate hairy bodies, as though gloating in its power over mere mortals.

The high stockade was, by some miracle, still standing in places. In other places it gaped open, showing the destruction within

the walls. Here the bodies were piled, corpses torn, scratched and bitten, telling of the panic that must have enveloped the community, as it fought for freedom. I wondered if any of the hideous denizens of the underground pit had escaped, but a glance assured me. The ruins of the main building were piled feet high over the vault of horror.

Of Ho Ming there was no sign. It was impossible that he had lived through the chaos that had enveloped the Island, but it was hardly probable that everyone was dead. We, to be sure, only owed our lives to our sheltered positions, but there might have been others.

The Island must have been situated in the very centre of the catastrophe, otherwise there was no manner of accounting for the terrible amount of damage. It seemed strange—ironical—that the toil and labour of a decade should thus be destroyed in a few hours. The Chinaman's schein had been a marvel of completeness, but the best-laid plans—

We retraced our steps in silence, each one a little chastened by the tragedy that we had passed through. We were nearly to the beach when I put the question.

"What made the Chinaman rush away like he did?" I asked Follansbee. "He turned a sickly colour and went for his life."

"Didn't you say that you heard his father's name mentioned?" the big man asked. "Well, it's obvious that the servant told him of the coming storm and he rushed off to comfort and protect his father. The paternal reverence is very strongly developed in the Oriental races, and he evidently cared for nothing as long as his father was safe. Recollect that all he had was made possible by the sacrifice of his parents."

We had reached the electric launch, beached high and dry where we had left it. As we swung it round, I voiced the unspoken question of the trio.

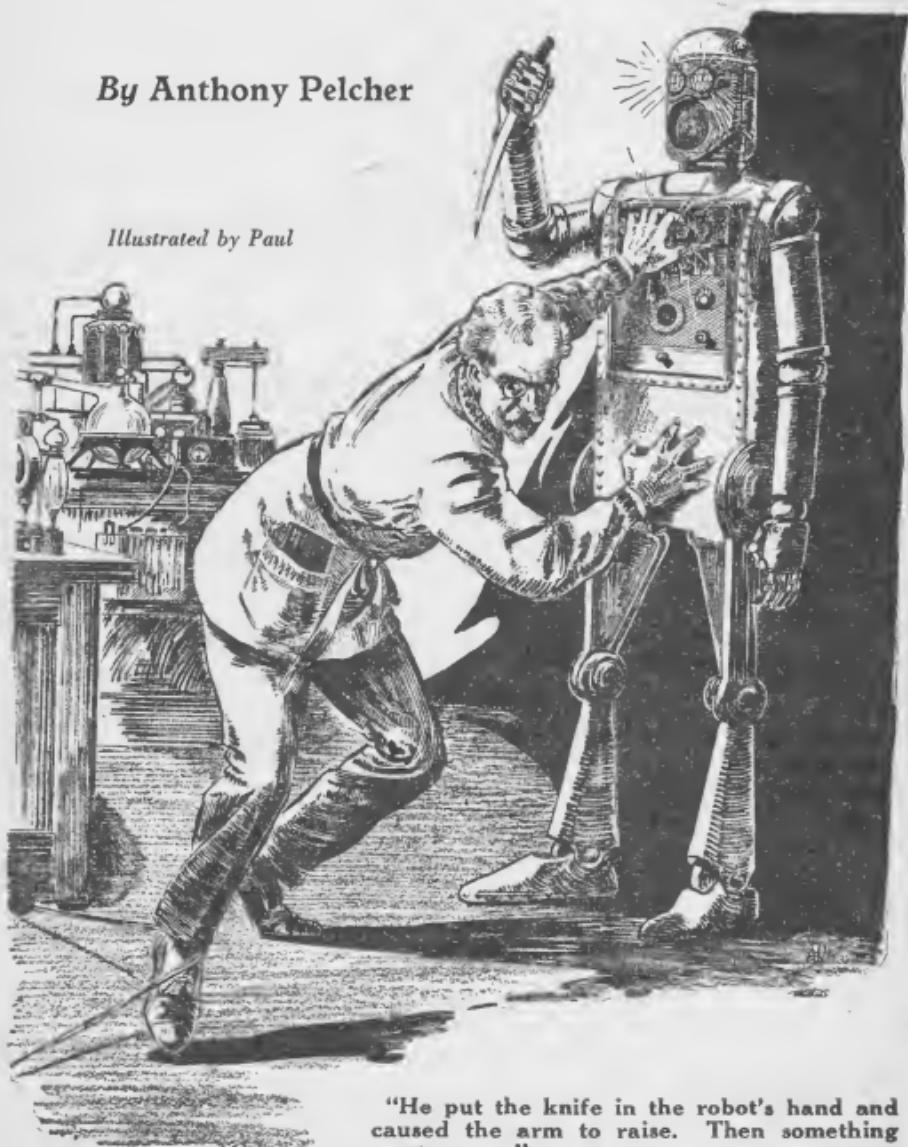
"Will anyone believe us?" I ruminated, "when we tell them where we have been and what we have seen? I very much doubt that I would, were a person to recount to me the—"

(Concluded on Page 895)

The Soulless Entity

By Anthony Pelcher

Illustrated by Paul



"He put the knife in the robot's hand and caused the arm to raise. Then something went wrong."

M ARVIN Martinoff was what might have been termed a contriver of queer contraptions. His home, his laboratory and his office were cluttered with clockwork, radio, and motor-operated jimmicks and his life was filled with plans for more and more odd mechanical devices. Some of the machines had earned vast sums for the inventor. Others were useless except as proofs of the workability of Martinoff's weird theories.

If it had not been for his robots which were among the world's greatest labor-saving machines, Martinoff probably would have been sent down as a crank, but there was no gainsaying his genius. He was regarded with a degree of respect and awe by others in his field.

That a grim and frightful tragedy lurked in the junk-like clutter of Martinoff's surroundings was suspected by no one. Nor did anybody even dream the strange developments which were to result from his experiments until one stormy night in September.

Yet it is not so strange that fate should play pranks when given such a heterogeneous mass of material to work with. Indeed, fate and destiny must have been sorely tempted by the clutter of these weird devices which seemed half human and half machine.

Like the planets, Martinoff's habits were

so regular that his movements could be predicted accurately in advance. Each day he worked in his laboratory and shop from eleven A. M. until five. Each night after dinner he worked at his home from seven until

heaven knows when. He was at his office only by appointment and these business appointments were few—for they usually bored him beyond expression.

His only close associate, Dr. Bliss Farnum, was strikingly in contrast to him. Farnum was a surgeon who worked in blood, nerves, bone, tissue and muscle, while Martinoff was working in metal. Dr. Farnum had a flair for radio and was quite an adept in this new science, which fact had brought the two together in a fast enduring friendship.

When the dread thing happened that forms the basis of this strange story, Martinoff was alone in his home.

He had just completed a new mechanical man. Fashioned of inert material, it was quite human in shape and appearance. It had a wax face, blinking electric eyes and a phonographic voice which could be amplified to an altogether

IT is only in the past few years that we have learned how much like a very complicated bit of mechanism we are. As far as our physical processes are concerned there is nothing mysterious or metaphysical at all; and many scientists confidently assert that artificial organs can be installed to work as well or even better than our natural ones. Thus artificial hearts have been used successfully on animals and their application to human beings is predicted next.

But it is a far cry from the substitution of physical organs to the use of artificial means of stimulating brain impulses. Except for our purely abstract thoughts our brains work because of the stimuli sent to them through nerves. Each of the hundreds of thousands of nerve ends has the possibility when stimulated of sending a message to the brain to do or not to do some act. But suppose it were possible to send such stimuli artificially and by appropriate means to even control the response of the brain. Then we have a complete control over a man's mind and body and perhaps over his — soul! That is the theme of this very unusual story.

inhuman volume.

On that fateful rainy night the metal monster stood back near the walls, its metal arms extended as if in greeting, its electric orbs blinking. Martinoff sat at his desk

opposite browsing over ancient scientific lore. The robot, controlled by radio impulse, could count, add, subtract, multiply, recite the Lord's prayer and do a good day's manual labor; but, as has been said, on this particular night it simply stood there with its back toward the wall.

It was in full tune and its electric eyes appeared to be staring banefully at the fullness of Martinoff's throat. On the table was a long, keen bladed Turkish knife, used by Martinoff to open his mail.

Such is the scene in Martinoff's study as it was reconstructed after sudden and bloody murder had been done.

OUTSIDE the rain fell in sheets and dripped dismally from the gabled eaves and turrets of the old fashioned house. The wind moaned and whistled.

Otto, Martinoff's personal attendant—the only servant on duty that night—said later that he had been obsessed by an uncanny fear all evening and at times had felt like rushing screaming from the quaint old house. He told this story tearfully, haltingly, and it had the ring of truth despite its almost unbelievable character. When questioned by detectives he said: "I loved Martinoff with a devotion that I cannot describe though he hardly said a word to me from one week's end to the other. He seemed to be working; but he was so good to me."

"In what way?" asked a brusque sergeant of detectives.

"Well," replied Otto, with a wistfulness in his voice, "when I fled from Russia and arrived here penniless I sought him out because his father and mine had been neighbors in Moscow.

"He took me in and paid me well. He made it possible for me to attend school and learn the language and allowed me at times

to assist him in fashioning mechanical things, a work I loved.

"Sometimes he would upbraid me for stupidity in fashioning metal parts, but always with a kindly, fatherly air. Invariably he would reward me after such scoldings with an extra dollar or two. I had everything I wanted. I could draw on the bank for any sums necessary for my own use or for the use of the house. But I did not take advantage of this, I assure you."

"Outside of bawling you out what did he ever say to you that might throw light on this case?" asked the detective.

"Very little. Once, after calling me dumb, he said, 'It's only the brainiest men who know how really dumb they are.' Another favorite remark of his was, 'Otto, a man should be big enough to be little enough to be big.' He admitted the remark was not original, sir—"

"Never mind all that boloney," broke in the detective, "tell us just what happened the night he was killed."

"It was a miserable night," Otto began tearfully. "I had been nervous and upset. He had left word that he was not to be disturbed and I was just aching for conversation. It was so dreary. I get that way sometimes—"

"Will you tell us just what happened?" exploded the detective with an oath.

"I was telling you sir, I—"

"Well then, go ahead. Martinoff was right, you are dumb."

Otto looked hurt but proceeded:

"It was my habit to serve him a cup of tea and some dry sausage and rye bread, or a bite of some kind at midnight, on nights when he worked. You know that thing, that robot. It could say the Lord's prayer. I was about to enter the room after knocking as was my habit. I had the tray on my hand. Then it happened . . . "



ANTHONY PELCHER

"What happened?"

"I heard the machine screech out. It yelled, sir—"

"Yelled what?"

"It yelled: 'Our Father who art in Heaven.'—Then it gurgled, sir. It gurgled mechanically and just then I heard a groan, a human groan, sir, and I heard a body fall. I was nervous, I was all upset, I was frightened. I did a most unmanly thing, sir. I dropped the tray there at the door and ran wildly out in the rain."

"Where did you go?"

"Nowhere, I just ran out, probably fifty feet from the house. Then I stopped and looked back. My knees were trembling, my heart was pounding and my head was hot. But the rain must have cooled me off some for I realized what a coward I had been and I went back to the house. Then steeling my courage I entered and you know what was there."

"What was there?"

"Just the way it was after I phoned you and you came in dripping and arrested me."

The Tragedy Reconstructed

THE detective was blustering with impatience. He banged his fist on a desk and swore full well-rounded oaths. He walked up and down while others at the grilling sat and watched him, and while Otto waved back and forth in his chair, his hands to his head.

Suddenly the detective banged his big fist on a table, around which the inquisitors and the prisoner sat, and commanded:

"Tell us what you saw before we got there."

Otto was jarred out of his fit of emotion. He raised his haggard, thin, angular features to the detective and pleaded: "Do I have to go all over that again?"

"Absolutely, and damn quick," thundered the detective. Otto proceeded.

"My poor master was lying at the foot of the thing—the horrible blinking man-machine. The knife was there beside him. The wound was on his neck. Blood was on the floor. On his head was another wound, it bled too. I looked at the machine and there

on its outstretched metal hand was blood, sir, blood and a tuft of human hair.

"I liked all but falling where I stood. I trembled and cried out. I moved about some but I was conscious that I should not disturb anything. Then I forced myself to action and phoned you, sir. I phoned you that murder had been done. I did not go back in the room. The rest you know."

The detective had heard Otto tell this story probably twenty times. Each time he told it the details were exactly the same. There was not the slightest discrepancy.

"Well, that's that," said the detective sergeant, and Otto was led back to a cell.

Turning to his co-workers, the detective sergeant said with conviction: "That guy is telling the God's truth and you can't try a machine for murder."

"You mean the robot committed the murder?" asked a thoughtful individual sitting at the end of the table.

"I do. It is hard to believe but what else is there to believe. That machine was too human to be safe. It had everything human but a heart and brain, and a human without a heart and a brain might be expected to commit murder."

Answering the look of incredulity on all the faces he added: "I mean this: Martinoff was fooling with the mechanism. He evidently put the knife in the robot's hand and caused the arm to raise. Why, I don't know. Then something went wrong and the arm descended. The metal of the hand brushed the side of Martinoff's head, cutting the scalp and tearing loose a tuft of hair and the knife was driven into Martinoff's neck. Martinoff then fell against the machine, probably he tripped over a wire; and jarring some mechanism. This caused the robot to cry out in an amplified voice and it caused the hand to open and drop the knife to the floor.

"Martinoff, of course, dropped like a log. Death came within a few minutes while Otto was running around without enough presence of mind to know what to do."

Odd as was this explanation of the death it was the one generally accepted by the newspapers and public and in due time Otto was released from custody.

There was one person, however, who did not accept this explanation of the crime. This single disbeliever in the mechanical murder theory was Dr. Farnum, closest friend of Martinoff. He determined to solve the mystery by a method which was as bizarre, fantastical and unearthly as the uncanny crime itself. He gave up his surgical practice and devoted all his time to delving into what appeared to him as the unsolved mystery of Martinoff's murder.

His first act in this direction was to hire Otto immediately on his release from jail. He gave him a position as attendant in his household, and later placed him under the direction of a woman nurse, a Miss Hilda Spencer. The nurse was ordered to instruct Otto in the rudiments of nursing. Both Miss Spence and Otto thought this an unusual arrangement but they followed instructions without comment. Miss Spence, a beautiful blonde type, at first believed Otto to be of ordinary intelligence. She was destined to learn later that he was really quite an intelligent fellow and that he fairly absorbed information.

The truth was that Otto, while dog-like in faithful service, was of good blood and came from a family well-educated in Russia. He was anxious to advance in his new world and was tireless in his efforts to grasp the learning that would fit him as a practical nurse. He was agreeable, had a pleasing personality.

CHAPTER II

The Confession

IT was three months after Otto had come into the household of Dr. Farnum, that the surgeon called him into conference. Otto found Miss Spence already seated and was glad that she was to hear whatever the doctor had to say.

"You two," began the surgeon without preliminaries, "are to assist me in a most unusual—I might say startling and unheard of experiment—and you must not fail me. If you do it will mean endless trouble and criticism for all of us."

The two merely nodded their assent and the doctor proceeded.

"Otto," he said, "I have never felt right about the killing of my friend, Martinoff, or should I call it a murder? I positively do not believe that he was killed by his strange man-machine as the coroner finally decided. I am going to tell you of a conversation I had with Martinoff the last time we were together and from it you will gather what we now have ahead of us.

"Martinoff and I were dining at the Science Club. He told me he had perfected his new man-machine and, for reasons of my own, I was interested more than you might imagine. When he had explained the mechanism in detail I told him of an idea I had long had in mind.

"'Mechanical engineers' I said, 'are busy making men of machines, and I believe it would be possible for me to make a machine out of a man.'

"'What! How do you mean?' he asked and his voice rang with incredulity.

"'You know,' I said, 'that I am a deep student of radio and I believe every man has in his nervous system a complete radio receiving set that could be hooked up with platinum wires to a mechanical instrument or instruments that would cause the human to register and act upon radio impulses. I do not mean for him to respond to the transformed waves or spoken word but the actual Hertzian waves before they are transformed into sound waves.'

"'Quite interesting,' commented Martinoff, 'why don't you go ahead and make such a machine-man?'

"'Because,' I replied, 'to do so I would have to kill out the will or the volition of the man before he would cease to be a thinking human and before he could be a machine in the flesh. Ethics would hardly permit of such vivisection,' I explained, and I had other compunctions. I explained that I had already invented a unit which could be used in such an experiment but that I had hesitated to use it even on larger species of dumb animals.

"I have brought you two here now to tell you that ethics no longer figure in this matter and my compunctions have fled. I am

going to find the man who murdered my friend Martinoff and when I do he will be the subject of my experiments. If these experiments are successful this criminal will become the first mechanically operated human being the world has ever known.

"It will really serve him right and will be good for him, because by depriving him of his free will and volition I will have curbed his criminal tendencies. I also will have made him a useful machine capable of heavy manual labor without the sense or the desire to protest against his fate. Do I make myself quite clear?"

"I follow you," said the girl.

"I am at your service," said Otto, "but how do you propose to find this suspected murderer and how do you propose to prove his guilt beyond question?"

"Leave that to me," said the surgeon finally and then he brought forth a small round object with attached wires. "Look," he said, "and behold my impulsaphone with which I propose to transform a human being into a machine."

OTTO and Miss Spence were all interest. They beheld a small object which resembled the receiving unit of a telephone. Otto noted that the attached wires were of platinum and that they were "frayed" at the ends, like frayed out string, into many ends of fine wire. They were so fine in fact as to be almost microscopic. Each multiple wire end was again "frayed" or divided into hundreds of additional fine terminals. When Dr. Farnum saw Otto examining these minute wires he said:

"The ends of those wires correspond with the branching out of tiny nerve lines from a neurone or nerve cell. It is my purpose to plant this mass of branched wires at points where they will interlace and communicate with important nerve centers in the human body.

"It will be a painful operation but the pain will pass as the system becomes accustomed to the new conditions. The nervous system is simply a telephone system anyway with the brain as the central office and the nerve centers as the branch exchanges and the nerves as the wires.

"In the human body there are many bundles of nerves or nerve trunks, just as there are trunks in a telephone system. The largest nerve trunk is the spinal column and I will extend minute platinum wires to every important nerve center and ganglion. This means we will hook up with the spinal cord at every vertebrae and that tiny platinum wires will be planted at all important reflex and other nerve centers.

"Many surgical operations, under a complete anesthetic, will be necessary and that is all that you two need to know at present. Now we will go about finding the killer."

The surgeon was addressing his remarks to Otto but he had known Miss Spence long enough to be sure she would not miss a word and that she needed no special instruction.

"You saw no one in the house on the night Martinoff met his death?"

"No one," said Otto, and his words were positive.

"Yet," said the doctor, "there was someone there." He paused for his words to have their effect.

"How do you know?" inquired Otto, surprised.

"I know," said the doctor slowly, "that there was someone hiding in the room with Martinoff and that he came there before the downpour of rain started."

"How do you know?" insisted Otto.

"I know because the machine could not have killed Martinoff in the manner described and if the killer had entered before the rain started he would have left his marks—wet ones. It was a heavy rain.

"Some man killed Martinoff, evidently for revenge. He was hiding in the room when you entered after the crime and he left when you ran from the house. You ran out the front way. He ran out the back. He had a car waiting near the lower road and made his escape back to New York. That is my theory."

"Quite possible," agreed Otto, "but I really do not know. Why are you sure that it was a man?"

"Because of the great force of the blow. I have treated hundreds of knife wounds

and experience and observation proves that wounds inflicted by a weapon in the hands of a woman are different from those inflicted by a man."

"O, I see," said Otto.

"Now listen, Otto," began the doctor again, seriously, "you can help me by filling in the gaps in my deductions. We all believe the doctor had no enemies. Now I want to know who were his visitors. Who came regularly to his house?"

"Nobody," emphatically asserted Otto.

"O, yes, there was someone," said the surgeon with assurance.

"No, one."

"Now think."

"I am thinking. There was no one at all, no—. O, maybe you mean the typist, the girl. That was strange. She came once in a while in the evening when Martinoff had notes he wanted to set down."

"I thought so," observed the surgeon with evident satisfaction. "Tell us all about her. You see we are working by an old rule—first find the woman. Now what about her?"

"I don't know much about her. You said a man did it. This is a woman, a woman typist."

"The woman will lead us to the man," said the surgeon. "Tell us about her. I have reason to suspect someone well acquainted with Martinoff's habits and the room where the murder was committed."

"All I know was Martinoff got her name from a charity list. She was from one of the rougher districts. She had a bad record but was trying to go straight, she said. Martinoff gave her a chance. She was pretty in a rough way and seemed willing and anxious to please. She behaved well, the little I saw of her except, she was given to slang, which nettled Martinoff."

"Did she ever act as though she was trying to impress Martinoff?"

"No."

"Or you?"

"O, no indeed. Why no, sir."

"What was her name?"

"Dorothy. Dottie she liked to be called."

"Her last name?"

"I don't recall. Let me see, it was a

Russian name. He got her from a Russian aid society, the Helping Hand, or something like that. Let me see,—no, I can't recall."

"No need to," decided the doctor. "Look her up tomorrow through this Helping Hand agency. When you get her name and address I will engage detectivees to get us all further information we may require. Good night to both of you. When I have anything further of interest I will confide in you."

Setting The Trap

IT was just one week after Otto obtained the required name and address that Dr. Farnum received a report from his detective agency.

"Dot Borsovich, reputed Russian agitator and Red, served eighteen months on the Island for a confidence game. Her male accomplice escaped detection. Has only one male admirer, an old friend who knew her in Russia. He is Nick Solokoff, big and burly, but quiet mannered. They attend radical meetings but their only real interest is in quick and easy money. The man is a lucky gambler. Politics with them appears to be a subterfuge to hide their real activities. Solokoff has no police record but is known in the underworld as a badger worker, a form of crime involving a confidence game followed by extortion at the point of a gun."

"I thought so," said Dr. Farnum, after reading the report.

A few nights later Dr. Farnum sat in a Russian restaurant. He appeared to be waiting for someone.

The scene about him was one of wild gaiety. Laughter was loud and quips of a rough nature were being exchanged with abandon and it was apparent that more than food was being dispensed. A Gypsy string band was playing and the dancing space in the center was crowded. The form of dancing was anything but refined. No one could be a stranger long in such a place.

The surgeon assumed the air of one thoroughly familiar with such scenes and heartily in sympathy with the crowd. More than one feminine glance was directed at his

table. This ogling he appeared to accept in good nature but with no further encouragement. Soon a large florid man entered with a frowzy female.

Once they were seated Dr. Farnum called a waiter and sent over a note scribbled on a prescription blank, the printed head of which he was careful to tear off. The note read:

"I am told you can take me to the house of Alex, the Greek. I will pay you well for your trouble."

The big Russian scanned the note. The waiter furtively indicated the doctor's table. Taking leave of the frowzy female abruptly, the big Russian, after scanning the surgeon suspiciously, came-over to his table.

The surgeon bubbled with an affability which immediately disarmed suspicion. The Russian sat down.

"Where did you get the idea that I knew Alex, the Greek?" he asked.

"Simple," chortled the surgeon. "I play once in a while for high stakes. A dealer in the Cottage Club told me I would find you here and that you would introduce me at the place of Alex, where I am told they can cover big bets. You are Nick Solokoff, are you not?"

"Who wants to know?"

"Well, it doesn't matter who you are. Can you make it possible for me to risk a few thousand at the place of Alex?" replied the surgeon with an air of one entirely at peace with the world.

"Nothing easier," said the Russian, "but where do I come in?"

"I will stake you with one hundred dollars," said Dr. Farnum, "and, besides, should I win I will declare you in for one half the winnings. My car is outside waiting. Shall we go?"

"On our way," replied the Russian, with a great laugh, for the surgeon's affability was not only disarming but was also contagious.

"A little drink before we go?" questioned the surgeon.

"You're on," agreed the Russian. The drinks were served. Just as the big

Russian reached for his drink the surgeon distracted his attention by a remark:

"Who is that important individual back of the desk?" he asked.

The big Russian turned half around and as he did the surgeon dropped a white powder in his drink.

"O, that's old Ivan, himself. He owns the place."

"Quite an interesting character," said the doctor, as they quaffed their liquor and left the place, the Russian waving a farewell to the female he was leaving behind.

CHAPTER III

A Strange Proposal

THE two piled into the doctor's car, which was waiting, with Otto at the wheel. The Russian gave an address and the car sped away. Within a few minutes he was unconscious from the drug administered in his drink and was leaning heavily on the surgeon's shoulder. Dr. Farnum was satisfied that at last he had the murderer of his friend helpless and completely in his power.

He was not vindictive or revengeful but neither was he in a frame of mind to adopt gentle methods in what he had determined to accomplish. If Solokoff had been conscious and could have realized the fate in store for him he would probably have chosen a quick death rather than to yield to his terrible destiny.

Otto drove directly to the offices of the famous surgeon. Solokoff was laid on an operating table in the room used by the surgeon for his private patients, and was securely strapped down. Then nature was allowed to take its course and in due time Solokoff, doomed to be the subject in one of the most astounding experiments ever recorded in human annals, awoke. He looked about him in a dazed manner.

"Keep still, it will do you no good to make an outcry," were the first words he heard and it was Dr. Farnum who was speaking.

"Solokoff," added the surgeon, purposely toning his voice to a deep and ominous note, "you murdered my friend."

Solokoff who could not see who was speaking did not answer; but there was a visible straining at his bonds. His head ached from the effects of the drug and his vitality was low. He was in the right state for a severe and successful grilling. The deep, uncanny voice continued.

"Martinoff was a scientist. You killed him and to atone you will now sign a paper before witnesses giving your body, after death, to the advancement of science. You will sign now. If you do not, you will die a horrible death within a few hours. I have you at my mercy."

"I'll see you in hell before I sign anything," blurted the Russian, his voice intensely agitated.

"If you sign I will see that Dot goes free. If you do not sign we will send Dot to the chair with you. Now let's see what kind of a man you are."

"I will sign," said Solokoff, in a tired voice, "but I ain't dead yet. Remember that."

A document which had been prepared and kept in readiness was produced and Otto, Miss Spence and a notary public were summoned.

Dr. Farnum addressed them simply, "This patient wishes to sign his will in which he gives his body to science after his death."

One arm of the patient was released. He was handed the paper and a fountain pen and without a word he signed the document. "You may go now," said Dr. Farnum turning to the others, "I intend to operate immediately." They turned to depart. The surgeon had mentioned operating to note the effect of his words on the Russian.

Solokoff strained at his bonds and started to cry out in his native tongue.

"Keep still," said the deep voice again. "Keep still or I will kill you." The face of the Russian was ashen. He made no further outcry. He was able to half turn his head and as he did so he saw his acquaintance of the restaurant. Amazement clouded his features.

"You?" he half questioned with an oath.

"Yes, I am Dr. Farnum, lifelong friend of Martinoff, and it is with me you will have to deal."

Solokoff noted that the doctor had a hypodermic syringe in his hands. He heard Farnum go to the phone and call the police, saying that he had the murderer of Martinoff in custody. Again he strained heavily at his bonds but an instant later the hypodermic syringe was forced home in one of his arms. Gradually he sank into a deep sleep.

The Confession

THE detective sergeant who had handled the Martinoff case soon arrived with four assistants. Otto and Miss Spence were summoned.

Addressing the detective Dr. Farnum said slowly, "Officer, I have taken the liberty to administer to this prisoner a liberal dosage of *scopolamine*, the truth-compelling drug, and under its influence you will hear a confession of Martinoff's murder. Should the court refuse to admit this confession in evidence, we still have other evidence of a damning nature.

"My detectives found this man's finger prints on the sides of Martinoff's robot. His revolver, which he feared to use, will be found in a Westchester County storm sewer. The proprietor and five men in a pool room were approached by this man in an attempt to arrange an alibi. My detectives threatened the six with arrest for conspiracy and they signed affidavits telling the whole and the true story."

"What's the idea of tying him up this way and filling him full of dope?" asked the detective. "Why didn't you call us sooner?"

"I called you as soon as was feasible," replied the surgeon in a tone that brooked no interference. "He was my patient before he was your prisoner, and I wanted to hear the story from his own lips. I have faith in *scopolamine*, and under its influence he will tell us the complete story."

The patient already had begun to talk.

"I didn't intend to kill him," began the confession, low and clear, and in Russian.

"Talk English," commanded the surgeon.

"I did not mean to kill him," began the voice, this time in English.

"Begin at the beginning," commanded the surgeon.

The story was clear and connected.

"It was a badger game." (The badger game is to get some prominent and wealthy man as a victim. The victim is forced into a compromising position with a woman and the man posing as the woman's husband rushes in with accusations and in a great rage. He demands prompt payment for his injured feelings and backs his demand by flourishing a revolver. There is no idea to commit murder and when a murder results it is because the victim shows fight or messes things up so that the man has to kill him to get away.)

"Using a charity dodge, Dot Borsovich would get employment with men of money and then I would come along and shake him down for as much as I could get.

"Martinoff paid no attention to Dot outside of business and we couldn't frame him with a badger racket so I decided to stick him up and get what I could. I had been losing heavily at gambling and we had to have some money.

"Dot let me in early in the evening and I hid behind that damned iron man. It was that crazy, praying metal thing that got on my nerves. When Martinoff started it counting and saying prayers it got me and I couldn't move. Once he ordered it to walk and I thought I was going to stand clearly revealed, but the thing just took a few steps forward and then back. It kept between me and Martinoff and he did not see me.

"The rain and the whir of the insides of the robot got me plum crazy. I was hoping he would go to bed and let me get out but he didn't. He came to the machine and reached around it and touched me. He reached in then and caught me and I put my gun in my pocket and grabbed him. He started to fight and I heard a noise like footsteps coming closer and closer. I was afraid to shoot so I jumped to the table and grabbed the knife and brought it down on his neck. He fell against the thing, striking his head against its outstretched hand, then slid to the floor.

"That thing, that damned iron man, with

the blinking eyes and wax face, it wobbled, then hell, if it didn't shout, 'Our Father, who art in Heaven.' I grabbed it to steady it. Then I wiped the handle of the knife with my handkerchief to remove finger prints but I forgot to wipe the metal sides of the machine where I touched it."

The form on the operating table stirred restlessly and the others in the room shuddered.

"I was so scared," continued the voice, "that I nearly dropped dead. There I stood looking at Martinoff bleeding and that damned thing, that iron man with white wax face and wobbling arms looked straight at me and blinked and blinked. Then I heard a knock on the door.

"I made one jump out the window and ran down the back gravel path and through the bushes to where Dot was waiting in the car all that time in the rain. She started to cuss me and I said, 'For God's sake, Dot, keep still. I killed him.' She started to whimper. I slowed up at the first storm sewer, threw the gun down and came to New York. I didn't breathe easy again night or day and I went around and saw the gang and tried to frame up an alibi. Then the cops said the machine killed Martinoff and I felt safe again."

THAT was all. Dr. Farnum turned to the detectives: "He is your man," he said, "he will be awake in about ten minutes."

The trial was not long and Dot was called only as a witness. On the advice of her man she told the truth and as a state's witness she was given her freedom after the trial. A month later Solokoff was electrocuted, and as the body was carried from the death chamber it was delivered into the hands of Dr. Farnum who had an ambulance waiting.

Otto and Miss Spence were with Dr. Farnum. There was a wild rush and scurry. As the body was being carried from the death chamber, Dr. Farnum leaned over it and injected a drug of his own discovery, a drug twenty times more powerful than *adrenalin* which heretofore was the most powerful of all heart stimulants.

In the ambulance the doctor and his as-

sistants watched the dead man with bated breath. The doctor said: "I am afraid we have failed." Then he hurriedly injected another dose of the life-giving drug.

There was a few minutes of soul rending anxiety, and suddenly the man once dead returned to life. He opened his eyes slowly. His lungs expanded and he took a deep breath.

Dr. Farnum, who had one hand on that of Miss Spence, gripped her until she cried out with pain.

"We have conquered," he said slowly, almost professionally. "I knew I was right. Electrocution does not really destroy life. It merely shocks the heart so that it stops beating. And if nothing is done about it, of course the body decays. My dose stimulates the heart to activity again." And like the nurse that she was, the girl replied without emotion:

"It is a success."

Otto burst into enthusiastic excited comments and was sternly silenced by the doctor.

"The patient has painful burns where the electrodes came in contact with his skin," said Dr. Farnum. "We will have to nurse him carefully. He is too valuable to lose now that we have resurrected him."

For the next few weeks Solokoff was kept bound and guarded. Careful nursing had resulted in the healing of his wounds and Dr. Farnum was ready to perform his great experiment. Solokoff aware of what was to happen to him, ceased to protest once he was assured that he would not be deprived of his life.

Otto and Miss Spence assisted the doctor in the operations which extended over a period of several weeks. Local and at times complete anesthesia were used to relieve as much as possible the patient from feeling any pain during the actual operations. Soothing drugs were administered to help him endure his sufferings while the many wounds made by the doctor's instruments were healing.

Dr. Farnum first severed certain nerves, causing paralysis of parts of the brain controlling will and volition. This completed, he had a word to say to Miss Spence who

had begun to protest against his planned procedure.

"My dear girl," he said, "humane scruples are one thing and common sense is another. This man has been dead. At death the soul is supposed to flee the body. If this is true our subject is a body without a soul.

"In depriving him of free will, I have removed his inborn or acquired criminal tendencies. He is harmless to himself and what is more important he cannot now go about harming others of his fellow men. Before I operated he was a menace to society. Now he is harmless, inarticulate, inoffensive animal. When I am finished he will be one-fourth animal and three-fourths machine. Under the term of his will I have the right to operate and I can't bring myself to sympathize with him. I am going ahead. If you care to withdraw from the case you may do so and I will get another nurse. If you decide to continue you will have a chance to learn much. You are not so wise that you can afford to throw away a chance like this."

Miss Spence was in the habit of permitting Dr. Farnum to decide matters for her and so it was in this instance. When they were finished Solokoff was a human radio set, tuned to receive Hertzian waves at a frequency of twenty thousand kilocycles. Since Dr. Farnum controlled a portable short-wave radio station, licensed to broadcast on this frequency, the experiment stood ready for a test.

For the mechanically inclined, a description of this human radio receiver might not be amiss.

On his head, resting like a helmet, was a large metal covering, with a space cut away for the exposure of the Russian's face. Resting atop the helmet and giving him a satyr-like appearance were two metal rods extending about a foot out on either side. Around them were hundreds of turns of a fine metal wire. The helmet held also a number of other queer devices the nature of which Farnum did not explain to his lay assistants, but to them, the things were sufficiently awe-inspiring to have an important place in the doctor's plans.

Exposed by his open shirt there was a dial control, and leading from this there began the fine wires that were to send the nerve impulses through to his nerve ends. If he were undressed he might, with the thousands of glistening wires over him, have presented the appearance of same strange nightmare-like horror; but Farnum with an eye to the aesthetic had covered up as much of the terrible as possible.

Between his shoulder blades and extending downward almost to the waist was a thin metal box containing the other necessary parts of the equipment. The power units were carried in his pockets and could be hooked up to him when he was finally dressed. He was indeed a living breathing man-machine, without volition, without a thought or desire that was not impressed on him by Farnum's radio broadcaster. Furthermore if theologians are to be believed, he was without a soul.

To Farnum's friends, an exclusive coterie of savants of high standing, Solokoff, the human radio machine, was a scientific sensation. He was exhibited to the chosen few and allowed to carry out practically all the functions of a normal human being but only on impulses broadcast by Dr. Farnum.

He was unable to feel pain, joy, despair or grief—and he could not feel even the pangs of hunger. If it were not for the fact that he was regularly impelled by Hertzian waves to take nourishment he would have starved to death, but without pain or without emotion his life depended on the batteries, carried in the pockets of his clothing and on the will of Dr. Farnum.

After traveling about the world with his strange machine for several years, Dr. Farnum, accompanied by Otto and Miss Spence, returned to New York. But they had not been home a week before dire events, on which they had not reckoned at all, began to occur.

In some manner, probably through a leak in the prisons, Dot Borovich learned that her man had been resurrected by Dr. Farnum after death in the electric chair.

Dot had gone from bad to worse and had come to be known in the underworld as the

gorilla woman, because of her cruel and relentless nature in dealing with victims and enemies.

For months she had been waiting and waiting—her whole life set only on the return of Dr. Farnum that she might at least see and talk to her man.

On their return, Solokoff was kept in a small tiled room over Dr. Farnum's private garage. He was given regular exercise and nourishment and was permitted to do small tasks such as washing Dr. Farnum's cars and putting about the garden. At times he was taken out and exhibited to scientists upon whom Farnum relied to keep his secret.

The gorilla woman took to hanging about the country premises of Dr. Farnum and was not long in learning where her man was lodged. By dint of much clever scheming she finally made her way into his quarters in the garage, and there ensued a scene and a situation without precedent.

In describing it later to Dr. Farnum and Otto, the gorilla woman said:

"I threw myself in his arms but he was blind to me. He paid no attention at all. I fell to the floor and grabbed his legs and begged him to talk to me and he just didn't seem to know I was there. I climbed up to his lips and kissed him and he was as cold as if he had been dead. I beat at his chest and he toppled over on a cot and just laid there, staring up, his eyes dead and not moving. I ran my hands over him and his pockets bulged with boxes with wires on them. I unbuttoned his vest and shirt and he had wires running all over him, but he breathed. He was dead and he actually breathed. My Gawd, it was awful. I screamed out and I guess I fainted. When I came to my senses I was in a bed and you was standing over me."

The doctor had found her there in the garage. He had carried her into the house and had revived her after placing her on the bed. Half delirious she had told him of her meeting with her man.

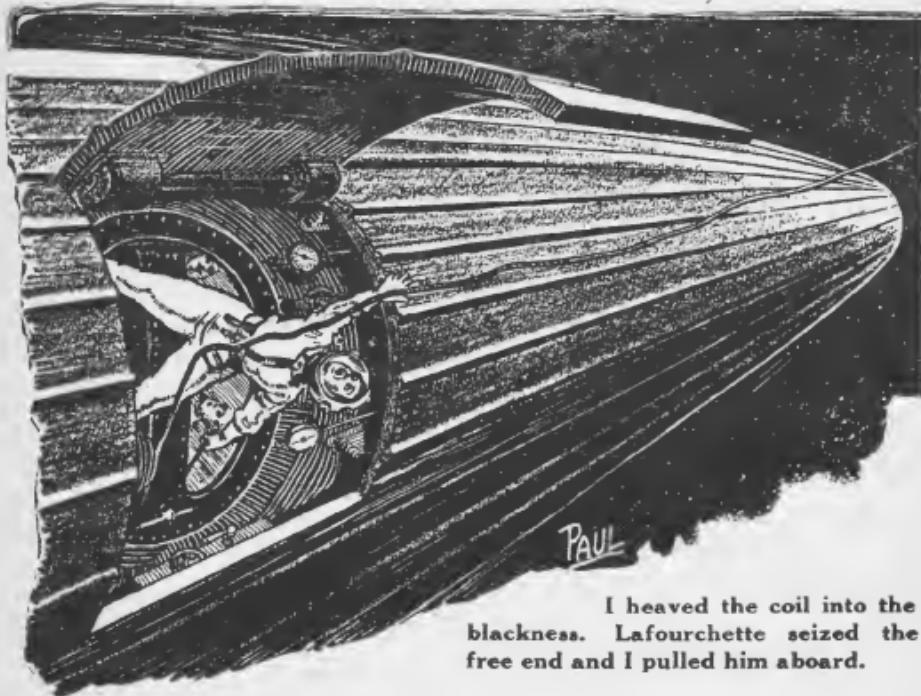
Patiently the doctor told the woman the truth. He went into minute details, couching his account in simple words. The wo-

(Concluded on Page 894)

The Outpost on

by Joslyn Maxwell

Illustrated by Paul



I heaved the coil into the blackness. Lafourchette seized the free end and I pulled him aboard.

What Has Gone Before

George Marland meets an old college instructor, Barton Wiley, and on resuming their friendship Marland discovers that Wiley has found the secret for nullifying gravity. They build an experimental ship and with the success of the material they obtain support for the building of a space ship. They travel to the moon and discover on this dead world some queer phenomena which point to the presence of an illuminated lunar satellite. Travelling over the moon to investigate it they run across a cone-shaped ship which flashes a ray against them and stuns them. They awaken to find themselves in the hands of a colony of human beings who are living on the moon. The colony is presided

over by a Dr. Forsscher who is a super-scientist. The two explorers are given to understand that they are guests of the colony—whose purpose they cannot discover—until they meet and talk with Forsscher. The colony lives beneath the moon's surface, but by the genius of Forsscher, they have all the advantages of food, sunlight, etc., as they would have on the earth's surface. With their guide, a Doctor Langley, the two explorers are invited to travel on one of the cone-ships, called tractors, on a tour of inspection of one of the airplants whose machinery has broken down. The tractors, they learn, are propelled by synthium, another of the products of Dr. Forsscher's genius.

the Moon

IN THREE PARTS — PART TWO



Now go on with the story

A GONG rang sharply in the engine-room. Four attendants took their places quickly, each beside a pair of the generators. In turn they called a series of readings from instruments before them through speaking tubes to the pilot house. This, Langley told us, was a check on the pilot's instruments. The gong sounded twice; the generators slackened their speed, and for a second quiet reigned. Then there was a hissing from the interior well, which rose to a shriek; the tractor quivered, and from the increased pressure of my feet on the floor I knew we were off. Looking through a window at our backs we saw the jagged surface of the moon sinking rapidly below us. We gained speed upward for several seconds; then the hum of the generators increased as the rising temperature of the synthium was checked. We were now traveling upward at some thirty miles an hour; it took us but a couple of minutes to reach an elevation of a mile or more.

A new sound directed our attention to two great gyroscopes which tilted through an angle of thirty degrees, inclining the tractor to one side. We now started off in this direction, gaining speed constantly

until, even at our elevation, the ground slipped by at an amazing rate.

Our window was a little off the direct line of flight, but we had a good view of the path before us. Many miles ahead we caught a glimpse of that tell-tale blue-yellow light from the other tractor, which had started off ahead of us. We were rapidly overhauling it, gaining speed continually, for there was nothing to retard our progress and the discharge gave us a constant acceleration. Presently we came up with the other machine and passed it, spouting its trail of glowing gas, a mile or two on our left. Its pilot was taking his time, having slanted the machine less than ours. It dropped back and presently was lost to our view.

Estimating our acceleration, I calculated that we were now traveling at nearly seven hundred miles per hour. We passed over a range of mountains whose tops were within a few hundred feet of our elevation, and I began speculating as to the consequence of a collision with them. Perhaps the pilot entertained similar thoughts, as at this moment the gyroscopes began to swing back to vertical. It was mistaken,

however, as they continued their motion, including at an angle of thirty degrees in the opposite direction. We must be half-way to the mine, and in the absence of friction as much energy would be required to stop as to reach our present velocity.

Looking out the window again, we saw the ground below us, now tilted at a different angle. It was difficult to dismiss the idea that we were climbing. By looking downward we saw the cloud of gas from the synthium preceding us and obscuring the ground immediately below us. As we continued, slackening our speed constantly, I wondered how a landing could be made with the view thus obstructed. I did not wonder long, however, so when our velocity had been reduced to about twenty miles an hour the hum of the generators rose, the roar of the gas became less violent, and we began to descend. A moment later the gyroscopes turned vertical, and we drifted slowly forward under momentum, dropping rapidly.

We could now see the air-locks to the mine, projecting above the ground a short distance ahead. The rate of our fall increased, until it seemed to me that the machine must be shattered. The ground was alarmingly close; the gas cloud had already begun to flatten out along the rocky plain. Then, at the last moment, our speed was checked and we drifted at a snail's pace a few feet above the ground. The surface itself was invisible, but its nearness could be seen in the behavior of the gas.

We descended gently the last few feet landing with hardly a quiver.

Langley and Wiley had already begun to put on their air-envelopes, and I quickly followed suit. It now struck me that although my helmet was sound-proof, the hum of the generators was plainly audible. Their note was the characteristic whine of electrical machinery, faithfully reproduced by

my radio receiver.

We hurried down through the empty compartment below and onto the surface of the moon. The air-locks lay a short distance before us, and the mechanics were already on their way there. As we approached, a crowd of men in air envelopes came out of the larger air-lock, pushing wheelbarrows full of iron for the colony's foundries. We stood by until the loading was finished. Meanwhile the second tractor appeared, dropping slowly from the inky sky. It nestled down near the first, which had now received its cargo and was preparing to take off. Even at our distance the note of the generators was quite evident, and its lessened volume foretold the blinding rush of gas.

It rose more and more rapidly to a great height; there was the faint rising whine of the current as it tilted over on its return journey. Meanwhile the second tractor had taken the men aboard, and it too rose in a burst of blue-yellow flames. Higher and higher, faster and faster, it went, as if bent on overtaking its companion. Its path

THE first installment of this thrilling interplanetary story opened up many sources of wonderment for the reader. What is this mysterious Outpost on the Moon, hiding away from civilization and fulfilling some unexplainable mission? Are its motives beneficial to the earth—or is it the agent of some gigantic attempt to control our destinies from the bleak surface of our satellite?

The present, the second installment, will reveal the secret of many of the events that have puzzled. We will find out if the Outpost is a menace, or if it is itself trying, unknown to the earth, to contend with some force that is directed against the earth. The secret lies in the gigantic brain of the mysterious Dr. Forscher, and when he speaks there will be set in motion a series of astonishing events that will take us to the furthest limits of the solar system!

through the sky was an irregular, crazy corkscrew.

I heard Langley mutter, "Why doesn't the fool straignten out?" Then the generators hummed again, faint and low at first, but higher and higher as they took up their load. Louder, higher, they whined. Langley watched, anxiety written in his face. Suddenly they were silent. Langley waved his arms, shouting: "He's overloaded them! He's burned them out! My God, *he can't stop!*"

Fascinated, I watched the machine, growing brighter, receding further, climbing into the pitiless sky. It was a tiny dot now, changing color; turning red, then white—the color of molten metal!

I turned away, unable to watch longer. Langley muttered, "Twenty men, and one fool pilot!"

Slowly we turned to the air-lock. The mechanics were huddled around the outside, eyeing us, some fearfully, some questioning, a few defiantly; all no doubt mindful of the return trip. For my part I was half inclined to risk walking back. The tragedy had affected us all and it was a silent and morose group that followed Langley to the air plant.

An Audience With Forscher

A BRIEF inspection was sufficient to determine the nature of the breakdown. A valve leading from the mixer to the storage tanks had jammed, allowing the freshly generated air to escape into the mine, while the storage supply also leaked out, leaving no reserve. The repairs necessitated a complete shutting down of the plant, and while this would not have been dangerous at the main colony because of its air-tight construction the character of the mining operations rendered it risky here. A deposit of iron was being worked, and while

some of the ore lay on the surface it was the practice to sink a shaft beneath the ore and work up. It was manifestly impractical to give the ore a substantial air-proof covering, and the jar of the mining operations might open up a crack in the rock through which the air would escape. For this reason the miners were shut off by an air lock, through which they could escape to safety in case of an accident.

The air-making machine was so compactly built that the dismantling of the valve exposed quite a bit of the inner works, and we were able to see how it operated. On the surface of the moon there lay large quantities of quartz, the common dioxide of silicon. This was placed in a container in the center of which was a small piece of synthium. The tremendous heat it generated, probably aided by a catalyst, liberated the oxygen, which escaped upward into a cooling tank. The residual silicon was subjected to further heating, while a blast of helium particles from the radioactive synthium passed through it and disintegrated each atom of silicon into two of nitrogen.



JOSLYN MAXWELL

The results of this operation were to convert silica into equal parts of oxygen and nitrogen. The oxygen was far in excess of the amount required to produce the proportion of one part oxygen to four of nitrogen existing in the air. The remaining oxygen, however, went to replenish the supply in the atmosphere of the mine, oxygen and nitrogen in normal proportions being mixed and stored to compensate leakage. Impurities in the air, such as carbon dioxide and smoke, were removed by well-known processes.

The task of repairing the valve was nearing completion, having occupied the time

we had spent in examining the machine. While the work of reassembling was going on Langley notified headquarters that we would shortly be ready to return. The machine arrived by the time the job was finished and was waiting for us.

The return trip was made without incident though each changing sound in the machinery of the tractor sent shivers up my spine, and we arrived in due course at the main colony. The news of the loss of the tractor had spread rapidly, making a profound effect. Throughout the course of my second meal in the dining hall it formed the main topic of conversation, and led to discussions of its probable cause. The men at our table review the possibilities of mechanical defects, talked of margins of safety and of overloading; while from time to time a stray phrase from another table voiced the opinion that the machines were unreliable, or that the pilot's recklessness was to blame. Langley, who knew more about it than anyone present, said nothing. He was scheduled for a conference with Dr. Forscher after the meal, and reserved his opinions.

Finally the gathering broke up into groups and sauntered from the dining hall. Wiley and I found our way to our quarters and were grateful for the relaxation of comfortable chairs and strong tobacco. We remained silent for the most part, for though there was much to talk over, it was tacitly understood that rest was at present more important. Wiley had had no sleep since we reached the establishment of Dr. Forscher, and I was still weakened from the effects of my long spell of unconsciousness. Our smoke finished, we bade one another good-night—Wiley remarking that two weeks of darkness would suit him well—and in ten minutes I was oblivious of moon, earth, and the entire cosmos.

My watch showed that eight hours had passed when the telephone rang sharply. Wiley had heard it sooner, and was at the instrument when I reached the living-room. I could make nothing of his conversation, but presently he turned to me with a grin.

"The boss is interested in us with a vengeance," he said. "I'm next on the conference list, and he wants me in a hurry!"

He bounded into his bedroom, shouting at me as he dressed and shaved. I was astounded at the speed with which he made himself presentable, but the cause of his excitement remained a mystery for the time. He promised me full details on his return, and was off in such a rush as I had not seen for days.

As I bathed, shaved, and dressed I gradually came fully awake; my dazed wonder at Wiley's tumultuous departure gave place to an intense excitement. I found diversion for a time in wheedling some breakfast from the chef, a German to whom a breach of routine was sacrilege supreme. But, returning to the apartment, a sense of anticipation grew on me. Eagerly I awaited Wiley's return, pacing the floor, smoking the air blue, wearing my watch pocket threadbare. I tried to read; there was nothing I had not thumbed half-a-dozen times. I contemplated a trip of exploration, only to dismiss it immediately for fear of missing Wiley. Minutes dragged. Twelve o'clock became half-past; then one; two, three.

Wiley burst into the room and hit me such a thump on the back that I was unable to more than gasp, while he exclaimed breathlessly:

"You're next, old man! Don't let him bluff you! Tell him you know your stuff! We'll have the world by the tail!" And he gave me a push that sent me flying into the corridor. Shouting a room number after me, he slammed the door.

MORE bewildered than ever, I set out in search of the room. It proved to be the office of Dr. Forscher, and I was immediately ushered into his presence by a silent secretary.

I had formed little conception of what the man might be like, other than that he must possess such an intelligence as I had never before encountered. But I was not disappointed. From behind a low desk a pair of eyes regarded me fixedly—eyes that seemed to look through me, to search out my very thoughts. They were sheltered by shaggy brows, yet seemed to protrude from beneath a massive forehead which might have contained all the knowledge of the

ages. A fringe of grayish hair, close cropped, surrounded the dome of his head; large, well-formed ears indicated an acute sense of hearing. His nose was long, thin, and rather out of keeping with the rest of his features. A wide mouth, thin lips compressed into a line indicating determination rather than hardness, surmounted a jaw like that of the Heidelberg Giant. He spoke in a resonant bass which rose from the barrel-like chest of his short, squat body.

"George Marland?" he asked. "I had not had the pleasure of your acquaintance before. However, your colleague, Wiley, has told me about you. I regret the slight inconvenience to which you were subjected a short while ago—" referring to the electric spark which had nearly ended my career. "We had no knowledge of your intentions, and thought it best to have the first word. I trust you will pardon it.

"I had intended to allow you to become more acquainted with our establishment before having this talk with you. Recent developments make it imperative, however, that we come to an understanding.

"No doubt you wonder, as did Mr. Wiley, why we are here. A fair question: why should a group of scientists voluntarily give up the comforts of earth for such a confined existence as we lead? It will take a bit of explaining. Let me say, however, that my assistants followed me here of their own volition. I only provided the opportunity. They, and I, are here solely to benefit mankind.

"The driving ambition of my life has been the advancement of human welfare. I came early to the conclusion that this was to be realized only through knowledge; or, as some put it, science. Hence I studied science in all its branches. I specialized in none; for with the burning ambition of youth, I hoped some day to know all there was to know. I mastered the practice of medicine, and its right-hand assistant, chemistry. I studied the laws and phenomena of physics, mathematics, and astronomy. I delved into psychology, biology, philosophy, and more.

"It was while a student at Berlin that the first event occurred which led me to my

present situation. Looking through my open window, I saw a meteor fall from the sky; not such a meteor as we frequently notice on clear fall evenings, but a most unusual meteor. While still high in the air, it burst into brilliant blue flame and scattered into a thousand pieces which hurtled downward, finally disappearing close to the ground. Shortly after, the breeze brought to my nostrils a faint odor, almost indistinguishable, yet unmistakable—the odor of burning sulphur.

"I was so struck with the peculiar behavior of this meteor that I called it to the attention of Dr. Steinle, professor of astronomy at Berlin. He agreed with me that the phenomenon was unprecedented, and concluded to ask for reports on it from other observers.

"The results of his inquiries brought forth a singular coincidence. No more data were forthcoming about our meteor, but twenty-nine days before, a meteor behaving exactly like it had been observed at San Francisco. The two were identical, except that the odor of sulphur dioxide had not been noticed. Its color, however, was that of rapidly burning sulphur. Furthermore, it had come from the same section of the sky—in the plane of the ecliptic, on the side away from the sun. We now broadcast the description of these two meteors, asking for further information regarding them or others like them, and set about searching the sky in that neighborhood for some strange body:

"Our search brought out another peculiar fact. The meteors had been seen for many miles around the points where they landed; they must have burst into flame almost immediately on entering the upper atmosphere. Yet, to our knowledge, there was not enough oxygen at that altitude to support combustion. They must have contained large quantities of it within themselves to produce such a brilliant flame; and indeed, their fierce light suggested combustion in pure oxygen.

"However, we were unable to locate any possible source of the peculiar bodies. On the nights in question, the moon, the stars of the constellations Libra, Scorpio, and

Sagittarius, and three of the planets — Mars, Jupiter and Neptune—occupied that part of the heavens, but no comets or other strange bodies could be found.

A Strange Bombardment

ON the fourteenth day after our search began, newspapers from the United States reported that a meteor similar to the first two had fallen over North Dakota, probably in the neighborhood of Devil's Lake. We could find nothing definite about the direction from which it had come; but twenty-eight days later we received a cablegram from an amateur astronomer in Cairo named Zirkle, reporting a fourth, in whose light he had detected the spectrum lines of sulphur.

"The absence of any comet or other source of this meteoric shower, together with their remarkable composition, began to suggest to me some design behind their appearance. There was a certain regularity about their arrival; the two longer intervals were exactly double the fourteen-day period (if the change of date at the international line were taken into account), and it was easy to imagine that others might have fallen unnoticed to make this period exact. But they were obviously not of earthly origin—they were too widely distributed. Were they, then, the work of intelligent beings somewhere out in space?

"Reasoning from that basis, I set out to discover, if possible, what sort of beings they were, where they might be, and their intentions in bombarding the earth. Considering the last item I agreed thus: The meteors were harmless; they had in no instance reached the surface of the earth, and while sulphur dioxide in sufficient quantities is poisonous, the relatively small amount which they liberated had no effect whatsoever. The brilliant light, however, was bound to attract attention, and I believed that this was the sole aim of the meteors. But why attempt to attract the attention of us earth-creatures, unless to lead us to their source? And who, other than beings possessing an intelligence comparable to our own, would wish to draw attention to themselves?

"Make no mistake; I did not assume they were *men*. Our physical form is merely the product of our environment, and without surroundings paralleling ours in great detail, it is extremely unlikely that the process of evolution would have produced an animal even generally resembling ourselves on another planet. However, they must have some things in common with us. To begin with, they were not greatly inferior to us mentally, nor could they be much further advanced than ourselves, else they must look on us as lower animals unworthy of attention.

"Furthermore, their science of chemistry, physics, astronomy and psychology must be akin to ours, as was proved by their knowledge, or suspicion at least, that intelligent life exists on our planet; their ability to direct a meteor, as we fire a gunshot, to a small target across empty space; their knowledge of the common meteorite, and ability to produce one so totally unlike it as to attract attention; and finally the expectation that this attention would progress from the meteors to themselves. Furthermore, they must possess the ability to perceive light-vibrations—not necessarily have eyes, but distinguish the same rays, or a part of the same rays, as we; and to distinguish one color from another. There was, then, considerable ground in common, on which we might build a basis for communication.

"But to communicate with them, we must know their location. Unfortunately, we did not know the exact direction from which the meteors had come; nor would we have been much better off if we had, for the attraction of the sun and other members of the solar system might have caused them to deviate considerably from their original course. But by noting the portion of the sky from which they appeared, we had computed their original direction approximately. Their being in the plane of the ecliptic suggested the probability that they came from some body in the solar system, and this at once narrowed the possibilities to Mars, Jupiter, Neptune, their satellites, and the asteroids.

"Having gotten this far, I needed more data. Nothing more could be discovered

from the meteors already fallen; closer observation of later ones was necessary.

"The next meteor somewhat upset my calculations, however, arriving on the north-western shore of North America three weeks later, where it was seen from both Prince Rupert, British Columbia, and Juneau, Alaska. The fourteen-day period was now destroyed, but I saw almost immediately that the intervals were all multiples of seven days. It might be that my unknown creatures had a knowledge of our calendar and were timing their shots to come once a week, but it seemed far more likely that they were fired at a regularly recurring time when the greatest accuracy was possible; that is, when some point on their planet was in line with the earth. Working on this assumption, I plotted the points of arrival on a terrestrial globe, and found confirmation of my theory. Each location pointed to the same spot in the sky; each was two, three or four times fifty-six degrees of longitude west of the preceding one; and furthermore, supposing that one had fallen every seven days, the intermediate spots were so little frequented that the fall must have gone unrecorded. The interval of longitude must correspond to a fraction over seven days—a few minutes less than four hours, in fact—in which the unknown globe completed its orbit.

"I projected my path of arrival into the future, and predicted the arrival of the next four. The first two, in Siberia and Asia Minor, would probably be missed, but the third should be visible from Paris. It came three weeks later, bursting almost over the city and causing no little excitement. I made bold to announce publicly that the fourth could be seen from Newfoundland, and when the consul at St. John's reported its arrival at two A. M. I considered my theory established. I had only to name a body in the solar system near the point from which the meteors had come, which completed its orbit in a fraction over seven days, and the abode of the beings was found.

"I published my analysis of the data, but the scientific world was loath to place credence in the work of an undergraduate

student. They pointed out that I had overlooked the simple fact that life as we know it could not exist where I said it did, shrugged their shoulders, and forgot me. To add to my discomfiture, the fall of the meteors abruptly ceased, and my intelligent creatures assumed a place alongside the fabled engineers of Mars as the creation of a mind which saw only what it wanted to see.

CHAPTER VII

A Gigantic Plan

"I WAS amazed at the hail of criticism which fell upon me. I became a nine days' wonder through the efforts of the newspapers; I was besieged by reporters, photographers, and the like, seeking interviews the better to deride me publicly. In short, my life became a veritable hell, and I was forced to abandon my studies and seek refuge for a time in solitude.

"My faith in my conclusions was unshaken, but one such experience was enough. I resolved never again to mention my planet and its inhabitants until I could lay before the world unquestionable proofs. Henceforth I devoted my life to obtaining evidence with which to convince mankind that I was right. But how to obtain these proofs? I must demonstrate that life was possible on my planet, and it seemed as though I could never do so.

"As you know, there are several conditions which are indispensable to any form of life we know. Foremost among these is an atmosphere containing a large portion of free oxygen. This is equally indispensable to life in the sea, for it is the pressure of the air which prevents the water from evaporating entirely, and the fish receive their oxygen from that which is dissolved in water. It is equally important that the climate must be moderate; that is, the temperature must not be so high as to injure the delicate chemical compounds of living bodies, nor yet low enough to prevent their functioning. Likewise there must be an abundance of water, without which the processes of life cannot go on. These condi-

tions are not sufficient by themselves, but if they are met, in all probability the situation will be favorable to the growth and development of some form of life.

"Whether or not they do exist on that planet is a question for the telescope and the spectroscope. If they are there, their presence will be betrayed in the spectra of water-vapor, oxygen and carbon-dioxide in its atmosphere.

"But accurate spectroscopic measurements with the instruments then available on earth were impossible. The entire planet could be seen in the largest of telescopes only as a minute globe, the size of a pea. I wanted to see it a hundred times larger; but this would require a telescope with a magnifying power of 60,000 to 100,000 diameters.

"Manifestly this was impossible; even though such a tremendous instrument could be built, it would be worthless. With the telescope then in use, the motion of the air was sufficiently magnified so that the heavens were seen as through a stream of water a foot or more deep; the practical limit was fast being approached. Unless I could find a way to get rid of the disturbing air-currents, there was little use in building a telescope any larger than that which has no doubt been completed for the Kingsley Observatory in the United States; and even its 200-inch mirror would be hopelessly inadequately for my purpose.

"A solution, fantastic yet intriguing, suggested itself; and indeed, you must now guess our object in being here—in establishing this outpost on the moon—is to build a telescope, where there is no air, where objects weigh only one-sixth as much as on earth, where the rotation is much slower, where celestial objects are visible whether the sun shines or not; where conditions ideal for astronomical observation prevail hour after hour, year after year, with no interruption from clouds, winds, or what you will.

"Anything seems easier in retrospect than before it is accomplished. I will not bore you with the details of my coming; let it suffice that I spent forty years seeking the

means of getting here; that I found it at last in my new element, synthium.

"But to return to the telescope. I mentioned that I would require a magnification one hundred times greater than that of any telescope used on earth. It is a well-known fact that the most efficient eye-piece for looking at extended surfaces has an enlargement of about twenty-five times for each inch of aperture, though greater powers are sometimes used. Sir Benjamin Wright had, at the time of which I speak, built a reflecting telescope one hundred inches across; hence his best eyepieces possessed powers of enlargement more than 2500 times. To give the magnification I wished my instrument must then have an aperture of four hundred feet! However, there are factors which reduce this figure materially. To begin with, the earth's atmosphere absorbs six-tenths of the light from the stars; here on the moon we get it all. Then, too, photographic plates may be used to accumulate light from faint objects by long exposure. In short, a telescope one hundred feet across would give the results I desired, if used on the moon.

"I recruited my little band of scientists and my force of laborers, built the tractors, and came here, eleven years ago. Eleven years is not too much time for the construction of so great an instrument; it is just nearing completion, and will be ready for the great test in a few months. And it will stand thereafter, a monument to science, a source of invaluable information, long after I have seen my theory proven. My only regret is that I cannot live as long as it lives and see with my own eyes the secrets of the heavens unfolded.

"However, I am an old man; though still vigorous I am past seventy, and can hope for but a few more years of active life. Yet the work I have begun must go on; the greatest benefactors of humanity are those men who have given to succeeding generations better tools with which to add to their store of knowledge. And so it is that I now seek a successor, to begin where I must leave off.

“THIS successor must be an exceptional person. He must be a trained scientist of the highest order; must be possessed of a brilliant mentality, great courage, and the ability to endure hardships; and above all he must have the patience, the endurance, to devote his life to his work, as I have done.

“I say, without egotism but as a statement of fact, that I know of no one man who possesses all these requirements. There are many who have a few, some who possess most of them; but none who can take over all of the responsibilities which must be assumed. Therefore, I have decided to pass on the management of this colony to a group of men, who, taken together, have all these qualities.

“Your colleague Wiley is a remarkable man; I hold him in the utmost respect. His attainments in the field of physics surpass my own in some respects. He is young, vigorous, brave to the point of recklessness; a man suited in many ways to undertake the task of carrying on my work. But unfortunately he is not an astronomer, and after all it is in that field that the greatest good will come from this outpost of science. Nevertheless, as a lieutenant to an able astronomer, Wiley will be invaluable. I have suggested it to him, and he is most enthusiastic.

“With him will be Dr. Langley, a hard-headed, practical engineer, who will be a useful counterbalance to Wiley's impetuosity. These two, and a third, will be the leaders of this colony when I retire.

“The third man will be an astronomer. He is not here; he knows nothing of this enterprise. In fact, I do not know yet who he will be. I have considered the men on earth whose ability I know, and have selected from them three possibilities. All were men of promise when I knew them; any of them is capable of doing the astronomical work. But I know little of them personally. Before I select one of them I must know whether he possesses the qualities I have mentioned, and whether he is in a position to abandon the earth for such a life as we lead here.

“I cannot go personally to interview these

men. I shall send someone who can take months, if necessary, to become personally acquainted with them, and sound them out before making any proposition. It will require diplomacy, patience, and resourcefulness. Moreover it will require an up-to-date knowledge of the events of the world.

“I should also like to maintain more or less regular contact with the earth hereafter, for various reasons. I need more laborers; there are doubtless scientific developments which should prove useful to me; and from time to time I shall want materials which are not readily procurable here.

“I have taken an hour of your time and mine to lay before you in some detail our situation, so that you may be prepared to answer the question I wish to ask you. It is this: Are you willing to be my intermediary between the moon and the earth?”

I had come for this interview expecting almost anything; yet I was utterly dumfounded at the doctor's last words. I controlled an impulse to question my ability, for I paid him the compliment of knowing men, and I felt sure that he would never have offered me the post without first making sure of my qualifications. Therefore I collected my thoughts and considered for a moment. I had no reason ever to return permanently to the earth, and if Wiley was to remain here and eventually come into a controlling position, there was every incentive for me to remain and see the thing through.

The doctor was sitting patiently awaiting my reply. His face was expressionless, yet those piercing eyes of his seemed to penetrate into my mind and expose the thoughts there. He smiled slightly, even before I spoke, as though he had already read the words which came:

“I shall be very glad to accept!”

It was some forty-eight hours later than Wiley and I had our first glimpse of the nearly-completed telescope. It was truly a monstrous thing. Built on the reflecting principle (since it is easier to make large mirrors of perfect figure than lenses of like dimensions), it measured one hundred feet across, and fully six hundred to the top of the “tube”, which was a criss-cross frame-

work of steel girders built to support the smaller mirror which deflected the beam of light toward its focus on the side of the instrument. On this tube was also a small platform on which the photographic apparatus was mounted, and which could be used for direct observation if desirable.

The instrument was housed in a dome similar to that of the ordinary terrestrial observatory, save that it was insulated against heat and equipped with an apparatus to maintain the temperature within a small range. This eliminated all deformation and possible cracking of the mirror due to heat and cold. The observatory was located exactly at the lunar equator, so that every star in the firmament was visible at some time or other. The twenty-eight day period of the moon made possible much longer single periods of observation of one body than on earth, where the duration of the night and changing conditions of weather often made it necessary in photographing faint objects to expose the same plate on several nights.

As I stood at the base of this greatest of scientific instruments, I sensed some of the gratification that the man who had made it possible must feel. I no longer wondered that he could shut himself away for so long a time, for I was becoming imbued with the enthusiasm that all these men here must feel, knowing that some day soon this great inquisitive eye would be turned on the heavens to search out its greatest secret—the whereabouts of other equally intelligent and curious creatures. Although realizing full well that it was a matter of months to the completion of the telescope, and after that many more months of careful research work before the theories of Dr. Forscher could be proven or discredited, nevertheless, as I stood near the axis of the cradle which held that hundred foot mirror, a feeling of restlessness, of expectation, came over me. I could not help but feel that we were on the verge of some great event; that the story which the telescope was soon to tell would be not only the answer to a question for which a great man had spent his life, but the beginning of a new era in science and the history of mankind.

On Earth Again!

MY opportunities to watch the progress of the construction were few, however. I set to work at once to master the running of the synthium tractors. For days I rode in the pilot house, silently watching the man at the helm as he sent the machine hurtling above the ground at terrific speeds; later I guided its course with my own hands under his watchful eye. I circumnavigated the whole moon in less than a day, seeing the rocky plains and jagged peaks of the hemisphere which had been forever hidden from my earthbound fellows, taking short jaunts directly away from the ground into the weird, mottled sky.

At length my instructor pronounced me competent to start out for the earth in search of an astronomer to collaborate with Dr. Forscher and complete the controlling triumvirate which was to succeed him. Time had passed quickly in our little underground world; I could hardly believe that six weeks had passed since my arrival. But the hour was at hand when I must return to my native planet. Dr. Forscher, Wiley and a few others were on hand to see me off, and after a brief exchange of farewells I climbed aboard with a small crew of engineers and a relief pilot.

The journey took only about two days, and there was little novelty in it. Once free of the moon's attraction we cut down the force of the discharging gas so that we gained speed at the rate of only one-sixth of a foot per second, each second; yet at the end of twenty-four hours we were shooting through space at the terrific pace of over 14,000 feet per second—better than a hundred and fifty miles a minute. The telescope in the pilot house occasionally picked up a tiny dot of light that revealed itself as a chunk of meteoric rock, and only a quick shift of the gyroscopes saved our rocketing tractor from being split from top to bottom.

We turned its base toward the earth and began to slow down. We must travel blind now, yet we were safe. The fierce blast of gas from the driving synthium blew obstructions from our path like chips in a

hurricane, leaving us nothing to do but make plans for our sojourn on the earth.

At length we sighted the rim of its night-shrouded face stretching away beneath us. Our speed was reduced to a hundred miles an hour—a snail's pace to us—and we dropped into the rare layer of hydrogen which marks the upper limit of the atmosphere. Below us was the gentle sheen of the Atlantic, glimmering in the pale light of the moon—a moon which had inspired volumes of poetry. Distance indeed lent enchantment to its jagged, blazing face.

Our immediate destination was the City College. Accordingly I turned the tractor westward, and at a now constant velocity we sped across the ocean. Day was breaking when we dropped gently to earth on the outskirts of the great city I had left less than two months before.

Two months! Was it possible that in so short a space of time my life could have changed so radically, so strangely? It seemed ages since I had said goodbye to a little group of scholars near the spot where we now rested. And how much more strongly must these sentiments have affected the others of the party, who had not trod the earth, seen trees and grass, nor watched the coming of the day in a dozen years!

We burst forth reeling and stumbling like drunken men, so unused were we to the strong pull of gravity. The tractor lay off the traveled highways, so we fastened its outer door with little fear that it would be molested. I led the way to a trolley line half a mile distant, thanking Wiley's foresight in taking along a fair sum of American money for our return. Dr. Forscher had provided a quantity of gold bullion to defray my expenses, but I could imagine the astonishment of a trolley-car conductor on being offered a ten kilogram bar as fare.

We left the trolley at a down-town hotel, where I engaged rooms for the others. Then, after a hasty breakfast, we set out in search of presentable clothes, for those we had worn on the moon were designed for service alone. My credit was still good, and we presently sauntered forth in unimpeachable garments.

I promised to arrange for living expen-

ses for the crew for a couple of months, and bade them goodbye for the present after exacting solemn promises to keep in touch with me and to be on hand for the return trip. They set off *en masse* in search of excitement, and I headed for the City College alone.

Dr. Willson had not yet arrived when I reached the Physics Building. His secretary ushered me into his private office, where I made myself at home. I had not been waiting long when he entered, stopping in his tracks as if facing a ghost.

"Marland!" he exclaimed. "We had given you up for dead! When did you get back? Where's Wiley?" His questions rushed in a torrent.

I answered the last.

"Up there," I said, indicating vaguely.

"On the moon?" He demanded. "He isn't—?"

"No," I returned. "Alive and well, and among friends."

He apparently thought me demented, and I added, "It's a long story, but I'll tell you about it."

I recounted briefly the facts of our being picked up by the lunar colony, of the remarkable works of science which had been done there, and of Dr. Forscher's purpose. When I reached this point Dr. Willson interrupted.

"What planet is this that he believes supports life?" he asked.

"He didn't name it," I said, "but I can hazard a guess. He described it as being at a great distance from the earth and having a period of seven days and four hours or a little less."

"That doesn't sound like a planet," commented Dr. Willson. "More likely one of the satellites—Saturn's, or Jupiter's."

"Ganymede," I affirmed. "The third of the satellites discovered by Galileo. It's period is seven days, three hours and forty-odd minutes. About 3,300 miles in diameter—quite a fair-sized world."

"But life there isn't possible!" he protested. "The sun gives it only 1-27th as much heat as the earth receives. Measurements have been made to show that the sur-

face temperature is 140 degrees* below zero."

"Dr. Forscher does not contest that," I replied. "He merely states that the evidence of the meteors is conclusive. However, the question will be settled soon." And I went on to explain my present mission.

"And you're to find the astronomer, eh?" commented Dr. Willson. "Did he specify anyone?"

"He named three for me to choose between," I replied. "Though I haven't any idea where to find them now. That was one object in coming here—I thought perhaps you might help me."

"I'll be glad to," he agreed. "Who are they? I'll get in touch with the Astronomy Department—they'd be most apt to know."

The names of the men were in a letter among the other documents I had brought with me. After a moment's search I found them.

"Bradley, Rondeau and Quaile," I said. "Bradley took his degree at Chicago, and was with the Lick Observatory for awhile. Rondeau was at Paris, and Quaile at Greenwich, I believe. But that was twelve years ago; there's no telling where they are now, of course."

"No," he agreed, "but I'll see if Radner knows anything of them."

He turned to his phone, and was connected with the Astronomy Department. After a few minutes' conversation, he reported:

"Bradley is in Africa, getting ready for the next solar eclipse. He's in charge of an expedition somewhere in the Jungle, and it would take months to reach him. Rondeau died in 1924—pneumonia. They say he would have been a great man, too; it's a pity. Thornton Quaile is in this country. At Flagstaff, in fact, doing research on the planets." He paused suddenly. "By the way, did you know—or of course you don't—that he has published a book recently on the conditions of the planets? He's become quite an authority on the Solar System. He'd be a good man to look up, I'd say."

"I'd like to read the book," I declared. "Have you a copy of it at the College?"

"At the library."

"I'll go there immediately," I said. "Much obliged for your assistance."

"Be sure and keep in touch with me until you go," he said.

"Of course."

At the library I obtained a copy of Thornton Quaile's treatise, "Life on Other Planets," and settled down to peruse it. The author tried to point out the folly of definite assertions about the matter. Referring to Mars, he observed that the popular theory of its "canals" must stand or fall on the question of whether its atmosphere contained water and oxygen; for without water vapor in the air there could evidently be none on the ground, and without oxygen no life could exist. Then he presented contrasting results obtained by different observers who had tried to settle that question without success.

"The very fact that we can live on the earth interferes with our attempts to find out about other worlds," said the book. "In taking pictures of the spectrum of Mars, in which the dark lines of oxygen and water appear, we are also photographing the air above us which contains these same lines. We can only guess how much of the spectrum on our plates belongs to Mars and how much to the earth. The water band, particularly, is subject to wide changes in a few hours, when a shift in the wind brings quantities of moisture to the air above us. Thus in the same night photographs may give results which differ by two or three hundred percent."

In a later chapter I found: "Venus, too, guards her secrets as closely as the Queen of Beauty for whom she is named. Two capable astronomers may point their telescopes at her clouded face. One announces that the length of her day is twenty-three hours; the other says six weeks."

"In the face of such conflicting data," the book summed up, "who are we to say there is, or there is not life elsewhere in the solar system? If you were to ask me: 'how shall we find out?' I should reply 'let us take our telescopes somewhere where there is no

*Centigrade scale:—220° Fahrenheit.

air to annoy us; or better still, let us go and see for ourselves!"

I closed the book and sat wrapped in pleasant thought. Unless I was greatly mistaken Thornton Quaile's wish would soon be fulfilled.

CHAPTER VIII.

Quaile.

I left the City College about noon, and hiring an auto, drove alone to the resting-place of the tractor. The last mile or so was over a bumpy cart-track, almost unused; and it was not easy to drive the car to the tractor's base. I set about removing my few belongings to the auto, together with the gold which was to defray my expenses. This last was a job which taxed my strength to the limit, but finally it was done, and I returned to the city. Here I deposited the gold at a bank, purchased a suitcase and some more clothes, and bought a railroad ticket to Flagstaff, Arizona.

The journey was long and monotonous. I bought a periodical from the news butcher and read until the jiggling print made my eyes smart. After a dinner of under-done beefsteak in the diner, I wandered back to the observation platform and watched the rails chase each other into the distance. As darkness fell I grew drowsy and presently fell asleep.

I imagined I was floating through space above a tiny world, no larger than a pea. It grew in size to a globe just big enough to stand on, and I set one foot gingerly on its surface. Then I became aware of another man standing before me. He was trying to communicate with me, as I could see from his gestures, but I could make nothing of them. At length, angered at my stupidity, he picked up an enormous ball of glowing sulphur and hurled it in my face where it burst with a terrific roar. I awoke to find a switch engine coupled to the rear of the train, its headlight illuminating the platform.

The other chairs were deserted except for the one next to mine, where there sat one of those talkative travelers who are always

ready to start a conversation, given the slightest opportunity. He was somewhat amused at my startled awakening.

"Where you going, friend?" he roared above the exhaust of the locomotive.

"Ganymede!" I roared back.

"Never heard of it!" he shouted. "Little place?"

"Bigger than North America," I answered. He looked at me, puzzled; then, apparently thinking I was trying to make a fool of him, he arose in a huff and went inside. I followed after a few minutes, and finding my berth made up I went to bed.

During the next day I speculated as to how I should approach Quaile in order to gain his confidence without disclosing my object. At length I decided to represent myself as an amateur astronomer and lead him into conversation about life on the planets.

After a change of trains I arrived at Flagstaff on the third day, and set out at once to locate Quaile. The observatory was some distance from the town, and it was well after dark when I arrived there. The big telescope was already pointed to the heavens, where Mars was visible in the western sky. Quaile was not in the observatory dome, however, I found him with a fellow-scientist, puffing an enormous pipe and discussing the respective merits of refracting and reflecting telescopes. His accent stamped him at once as a Britisher. He was about average height, partly bald, and wore a tiny blonde moustache. I judged he had recently turned forty. He was a jolly, lively person, and I felt at once that I liked him.

"Y'see," he was saying, "They can't make these lenses big enough. Give me the reflectors—they get so much more light from the planets. Now, if I could just take that big fellow at Mount Wilson up about fifty miles where there's no air, I'd show you some jolly good photographs."

I felt an impulse to tell him that his wish would be more than granted if he went with me to the moon; but I must not be too hasty. I apologized for interrupting their conversation, and introduced myself. The other man excused himself, saying he had work to do. Quaile seemed surprised that

I should come all the way to Arizona merely to talk with him, and not a little pleased that I considered him the foremost authority on the planets. I told him that I had a theory regarding one of Jupiter's satellites, and would like to talk it over with him when he had the time.

NO time like the present," he said promptly. "Let's make ourselves comfortable, and you tell me about it." He settled back in his chair, still puffing his huge pipe, and listened with interest as I explained that I believed Ganymede might be the abode of life. I suggested that the satellite might receive enough heat from Jupiter to make it habitable; but I was forced to omit Dr. Forscher's most convincing arguments, and my reasons lacked force. Instead of laughing at me, however, he heard me through. When I had finished, he explained the opinion of present day astronomers.

"Y' see," he said, "there have been a few measurements of Jupiter's temperature, which indicate that it's pretty cold there—say a hundred and forty Centigrade below zero. There's nothing in the way of plant or animal life that could live at such a temperature. We don't know of any reason why the satellites should be warmer, so that just about lets out the possibility of men being there."

However, my insistence on the point aroused a spark of interest in his mind, and he suggested that I stay around until the present series of measurements on Mars were finished. By that time Jupiter would be in a favorable position for observation early in the mornings, and he promised to try to find out something about Ganymede.

I found accommodations in Flagstaff, and spent much time in Quaile's company. He was passionately devoted to his work, and had no other interest except music. He was a capable performer on the violin, and often whiled away his leisure hours entertaining small audiences with the dreamy tones from his skillful bow. I secretly rejoiced to learn that he had no family ties, since this removed the greatest obstacle to his going to the moon. I found him an

excellent fellow, and enjoyed spending hours with him at the observatory as he sat at the eyepiece of the telescope, motionless as a statue, following the path of the "Red Planet" across the firmament. We exchanged few words during such times, yet a considerable friendship grew up between us. I bided my time, waiting for an opportunity to broach the subject uppermost in my mind.

It came one night a month or so later. The spectroscopic work on Mars was suspended for the time being, and we went one night to the observatory to train the telescope on Jupiter and his satellites. The planet did not rise until two o'clock in the morning, and was still low on the horizon when we turned the dome to the eastward and focussed the eyepiece. In the field of view we could see the disc of the great planet, streaked with belts about the middle. Near one edge was a grayish blot, the remnant of the "Great Red Spot" which caused much comment among astronomers half a century ago.

Scattered across the field like so many stars save for their slightly greater size, were three dots of light, one almost touching the planet's edge, the others farther away on the opposite side. These were Europa, Ganymede, and Callisto—the second, third, and fourth of the satellites first seen by Galileo in the early seventeenth century. Io, the first, was eclipsed by Jupiter's great shadow.

We brought Ganymede to the center of the field and applied a higher-powered eyepiece. It now appeared about the size of a large buck-shot, a tiny disc of light which wavered slightly, swelled and contracted, as the trembling atmosphere above us distorted the beam of light that reached the great lens. We could see nothing of its surface characteristics; it was like looking at the entire map of Asia drawn on a pea. I imagined looking at it through Dr. Forscher's giant telescope, making it appear a hundred times larger. What would we see then—oceans and continents, clouds, or a barren waste of ice?

*Any large telescope shows the stars as small discs, due to diffraction.

I resigned the eyepiece to Quaile, and he peered through it intently for a moment. Then he shook his head with a sigh.

"Bad seeing," he said. "The thing jumps around like a cricket." He climbed down from the observer's station on the step-ladder beneath the telescope. "Y'know," he observed, "If we could find a way to get rid of that motion we'd be able to find out a lot more than we can now. It's bad to-night, but it's always there."

Quaile Decides.

I DECIDED to spring my proposition.

"When I first saw you," I began, "You were saying that you'd like to take the Mount Wilson telescope up above the atmosphere." He smiled. I drew a breath and plunged ahead. "What would you say if I told you where there was a bigger telescope on solid ground, with no air above it at all?"

"You mean, someone's put one on top of Mount Everest?" he asked, puzzled.

"Better than that," I replied. "There's a telescope ready for use now, waiting for the man to handle it, that would make a dozen of the Mount Wilson reflector."

"Y'know, you interest me," he said. "Go on."

"The mirror of this telescope is one hundred feet in diameter," I said. "It can be used with eyepieces magnifying up to 100,000 diameters. And there's absolutely no atmosphere around it."

"Where?" he demanded.

"On the moon," I said.

"Oh, I say now," he exploded. "It's all very well to joke, but you carry it a bit far."

"No joking about this," I said, "And you needn't have any fears as to my sanity. I can prove every word I say. I've seen that telescope with my own eyes; and there are men within our reach who will back up my statements. Say the word, and I'll take you there. In fact, that's the reason I'm here!"

Quaile was thunderstruck, naturally enough. He pulled out his handkerchief and wiped his forehead.

"Well!" he said, and again, "Well!"

After a moment he asked, "But how the devil does one get to the moon?"

"Two men have done it independently by different means," I replied. "I can take you there—if you're interested."

"Interested? Well, rather. But y'know, it's somewhat of a knock, all this about a telescope on the moon, and men going there. How can one live there, without any air?"

"There are several hundred men living there now," I said, "Making their own air."

This was the last straw for Quaile. I saw that he regarded me as a raving maniac.

"Yes, of course, old fellow," he said placatingly. "But let's not bother with it. What say to a cup of tea, and we turn in?"

"It suits me," I agreed. "But do me a favor. Perhaps you've heard of Dr. Willson, the physicist?" He nodded. "Send him a wire—ask him whether my story is true."

Quaile seemed doubtful, but I pressed him, and finally he agreed to do as I asked. I accompanied him to the telegraph office where he dispatched a wire to Dr. Willson, asking for a prompt reply. Then he went to bed, for the day was breaking, and the astronomer, like the owl, seeks his home during the daylight hours.

When we awoke the following afternoon, Dr. Willson's telegram was at the observatory:

"MARLAND'S STORY REGARDING TELESCOPE UNDOUBTEDLY TRUE STOP HE HAS MY COMPLETE CONFIDENCE—WILLSON"

Quaile was impressed, but I saw that he still regarded the affair as a hoax. Nevertheless I followed up my advantage.

"If I can show you a machine which will take us to the moon, will you go with me?" I asked.

"Seems like a fair proposition," he assented. "You won't mind, of course, if we don't say anything about this to the men here?"

"Not at all," I assured him. Obviously he did not want to be made a laughing-stock in case this should turn out to be a fool's errand.

WE packed our baggage and took the train east a few days later. Quaile was a jolly traveling companion, and despite his not entirely unjust suspicion of me, the trip was enjoyable. However, as we neared our destination, a doubt assailed me. During the entire month of my sojourn at Flagstaff I had not heard a word from the crew of the tractor. What if they had deserted me? I could not very well manage the machine alone for the return journey, and I could not find another crew. With this in mind, I set out at once for the spot where I had left the machine, Quaile going with me.

The tractor had been screened from the roads by a grove of trees, and it was with mingled elation and fear that I led the way to its resting-place. However, I was in no way prepared for the sight which met my eyes. I recognized the trees, the surrounding knolls, the exact spot; but there was not a sign of the tractor!

"It's gone!" I exclaimed, rushing forward. There was no doubt that this was the right place. There was a patch of bare ground, where the discharge had burned away the grass. "Gone!" I repeated.

"Yes," observed Quaile, "it seems to be take leave of one, eh?" His face wore a knowing smile. He thought his suspicions were confirmed, and that I was crazy beyond a doubt.

"Quaile," I said fervently, "on my word of honor, that machine was here. I'm going to take you to Dr. Willson and let you hear from him the facts about this. Whatever has become of the machine, I am going to prove to you that I am neither a liar nor a lunatic!"

In a fit of hopelessness I turned toward the city; but we had not gone ten paces when I heard my name called. I turned, and saw a man hurrying towards me over the nearest hillock.

"Mr. Marland!" he called. We stopped, and he caught up with us, out of breath. It was the relief pilot!

"I was afraid I'd miss you, Mr. Marland," he panted. "The machine's in a field a couple of miles from here. Some picnickers found it and got curious, and we had

to move it. One of us had been on the lookout for you all the time. We thought you never would come!" he added.

I was too relieved to ask any questions. The pilot led the way over the hill to where a tent was pitched beside a battered car. The crew had established a camp here and kept a lookout night and day for my return. We took down the tent, bundled it into the car, and the three of us climbed in. The pilot drove up off into the country, to a bare, unsettled spot. There, in the hollow between two knolls, lay the tractor. The pilot blew the horn of the decrepit auto, and the rest of the crew, lacking only one man, came tumbling out to greet us. My amazement knew no bounds. With their first opportunity to visit their homeland in twelve years, these men had elected to live right in the tractor!

CHAPTER IX.

A Leak!

THE pilot, acting as spokesman, explained the situation.

"We all went off to look up our families and friends," he said. "They thought we were dead, and had made heroes of us. When we showed up, hardly able to walk on account of the gravity, and not knowing anything about what's happened on earth, they didn't know what to make of it. And when we said we'd been on the moon, they thought we were crazy. Our wives and sweethearts have all married other men, and our friends didn't know us. We tried to get work, and couldn't hold a decent man's job. Nobody wants us here; we've got friends on the moon. We want to go back!"

Quaile was convinced. There was nothing left but to load our baggage and start for the moon. I checked over the supplies of food, water, and air in the machine, and made a list of the things we would need. Then we went back to the city, leaving the crew to care for the tractor until our return. On the morrow we visited Dr. Willson, purchased our supplies and picked up our baggage. Loading it into the car, which

we had borrowed for the occasion, we drove out to the tractor. The crew assisted in loading, and in short order we were ready to start off.

I climbed to the pilot house, rang the warning gong, and sent the gas roaring through the central well. I paid no attention to the position of the moon, preferring to set the course after we were free of the earth. We climbed slowly at first, not wishing to overload the machine, which must exert a tremendous force merely to overcome the earth's pull. It took us upwards of an hour to reach a point sufficiently far away to neglect its gravity. Then we turned in a great circle toward the moon, which was visible over the edge of the globe to the west, toward the sun. The tractor gained speed rapidly, and we were soon far away from the earth in the midst of the airless expanse of the solar system.

Quaile was immensely excited at the strangeness of his surroundings. He remained for a long time at one of the windows, his eyes glued to the glass, giving vent from time to time to exclamations of amazement. I could hardly restrain him from turning the telescope in the pilot house on the planets, and he was filled with impatience when I told him that it would take two days to reach the moon. He explored the tractor from end to end, asking innumerable questions about its construction, source of power and the like. When my shift in the pilot-house was over he bombarded me with queries about the colony on the moon, which he had up to now regarded as a figment of my imagination.

I told him what I could of the way it had been built, the principles which made it possible, and the work done there, but I was hard put to satisfy his curiosity. It was with the greatest difficulty that I persuaded him to take some sleep, and only got him to do so by pointing out that the time of our trip would seem shorter if he did not remain awake so much.

By the time we had reached the half-way point and turned the tractor about, however, he lost some of his impatience. He got out his violin and played to us for an hour or more. He was really an excel-

lent musician and had a remarkable repertoire. His taste ran more to dreamy, soothing melodies and those of lighter character, and between numbers he kept up a running fire of talk, recounting the history of each of his selections and explaining his interpretation of them. He had an excellent ear and possessed the sense of absolute pitch to a high degree. There was no doubt that, had he chosen to do so, he could have become a famous artist.

During the rendition of "Liebestraum" he suddenly put down his bow and began tuning the strings. I had noticed nothing wrong, but he said with a grimace:

"The thing's deuced sharp. Must be that the air's very dry here." He picked up the bow and continued playing, but he had gone only a few bars when he again stopped.

"Really," he exclaimed, "it's most astounding! I never heard an instrument get off pitch so quickly. The air has a remarkable effect!"

SUDDENLY a thought flashed into my mind: Sounds are higher-pitched in thin air!

"The pressure!" I shouted. "Get into your air-envelopes quick!" I dashed for the suits hanging along the wall, noting the air-gauge as I pulled on the nearest. The pressure was only twelve pounds, and as I watched it fell lower. I rushed up to the engine room to warn the men on duty, while others who had put on their envelopes followed to relieve them. Then when we were all protected, we set out to hunt for the leak. By closing the air tight doors between the compartments and noting the air pressure in each we quickly located it in the lowest section. The glass windows were all intact; but after fifteen minutes' search we found a small break, clean as a bullet hole, in the outside wall.

Let me stop a moment to explain the construction of the tractor's walls, of which there were two. The outer was built to withstand the impact of meteorites too small to be seen in the telescope. It was not air tight; as soon as the machine left the atmosphere all the air between the outer and

inner walls escaped, leaving a perfect vacuum which prevented loss of heat by convection. The inner wall was lighter, of air proof construction, and was coated with asbestos. Just before reversing the tractor, when we were at the peak of our velocity, we must have encountered a small object of extreme hardness, which had punctured both inner and outer walls.

We closed off this section of the interior, welded a plug into the hole, and brought the pressure up to normal from the reserve tanks. Then out of curiosity we began a search for the meteorite which had caused the trouble. Quaile spied it, in a corner near the air lock. He brought it to the light where we examined it. It was perhaps half an inch in diameter, with a rough surface under which a tiny glitter of fire could be seen. Quaile rubbed it sharply against the steel partition, making a deep scratch.

"A diamond!" he exclaimed. "A diamond flying through space!"

There could be no doubt as to the correctness of his assertion. The characteristic hardness, the fiery sparkle—it was the rarest of meteoric stones, which had struck our tractor by the barest chance.

Quaile pocketed the stone as a souvenir.

"Y'know," he said, "I rather like this space-flying, what with picking up diamonds and all. But I hope we don't meet them much bigger!"

A little over two days' travel brought us close to the moon. We circled rapidly around its surface to the spot on the equator where Dr. Forscher's outpost was located. Quaile never ceased to enthuse over the wild, rugged landscape beneath us, eying it with binoculars for many minutes. He seemed amazed that none of us had taken the time to explore it mile by mile, or examine the character of the rocks and the depths of the fissures. This had been left to the geologists of the colony, and none of us was acquainted with the results of their work.

The Great Telescope

WHEN we sighted the protruding air locks of the entrance near the en-

closure where the tractors were stored, his excitement knew no bounds. The chief of transportation was on hand to greet us, and as we donned the radio-equipped air envelopes his voice could be plainly heard, giving directions to the mechanics who were to overhaul our tractor. We descended the elevator in the air-lock shaft, and were met by Dr. Langley in the corridor inside. I introduced Quaile, and Langley immediately escorted him to the quarters which had been prepared for him. I departed for the apartment which I shared with Wiley, and found him there. He jumped to his feet as I entered, his face beaming.

"Welcome back, old man!" he exclaimed, pumping my hand. "What news from *terra firma*?"

I told him of my visit to Dr. Willson, and recounted my adventures while in America. He listened eagerly, interjecting questions about his colleagues at the City College. I could tell him little of them, having spent so short a time there, which I now regretted. When I had finished, I asked:

"How's the telescope going?"

"Finished!" replied Wiley. "Finished and tested. Man, what a marvelous thing! They've got a picture of a sun-spot that will knock your eye out! I never saw such clearness. You see, when Dr. Forscher knew there was to be an astronomer shortly, he pushed the work to the limit, and they put it together in record time. It was tested out only a few days ago, and the old Doctor was so tickled with it he nearly smiled!"

This news set me all a-tingle. I would have set off at once for the observatory, but Wiley counselled otherwise.

"It's bed for you, young fellow," he said. "You're dog-tired, even if you don't know it. You look as if you hadn't slept for a month."

I agreed reluctantly, and we turned in; but sleep was long in coming, and filled with scrambled dreams of tiny worlds, sulphur meteors, huge telescopes and diamonds from the Great Void.

After breakfast there was a conference. Dr. Forscher, Wiley and Quaile were present, and I was invited as a matter of cour-

tesy. As usual, the Doctor dominated the conversation. Addressing himself first to Quaile, he said:

"I have put forth every effort to produce the most perfect telescope humanly possible, as you have been informed. No doubt Mr. Marland has told you, as well, my principal motive in doing this. I have personally tested out the instrument, making photographs of the sun and other bodies, with very gratifying results; but I have deferred the work for which it was designed until your arrival. In our laboratories here on the moon we have worked out methods of photography which we believe excel those in use when I was actively engaged in astronomical work some years ago. However, there may have been developments in the technique on earth of which I know nothing; and for this reason I shall turn over the major portion of the research to you, after giving you the benefit of our developments."

"I am greatly honored," said Quaile simply. "Of course I shall want to spend some time getting acquainted with the instrument so that I can interpret the results accurately."

"That is wise. You will have ample opportunity to do so," returned the Doctor. "The body upon which this research is to be conducted is the largest satellite of the planet Jupiter, euphoniously named Ganymede by its discoverer. Jupiter is not now visible from the observatory; it will rise in something less than two hundred hours, and remain visible thereafter upwards of three hundred. I hope that in that space of time enough work can be done to give some indication of the condition of the satellite."

"I'll do my best," promised Quaile.

"Very well," said the doctor. "I'll leave you to your own devices, with the understanding that you may call on anyone here for whatever assistance you may wish."

THE brief meeting broke up, the three of us leaving the doctor alone. Wiley had experiments in progress at the Physics Laboratory, but I was a man of leisure for the present, and at Quaile's invitation I accompanied him to the observatory. We had

had a brief glimpse of the telescope shortly after his arrival, but had not yet had an opportunity to explore the observatory or look into the eyepiece. When we reached the dome we found one of the men who had been engaged in directing the construction and assembling of the instrument. He was clad in an air envelope, and before going further he motioned us to dress ourselves similarly. Then we proceeded through the nearby air lock and entered the telescope dome. Our conductor explained the operation of the instrument as we made a tour of the room.

It was obviously impossible to keep air in the dome of the observatory, but there was a small booth mounted near the base of the telescope which could be hermetically sealed, so that the observer need not wear his envelope. Here he might look directly at the image from the big mirror, or guide the photographic plate by means of an auxiliary eye-piece.

The observatory was located exactly on the moon's equator. This served two important purposes. In mounting so enormous a telescope it would have been difficult in the extreme to tilt its axis at an angle; yet the mounting must enable the instrument to follow the path of any star across the heavens. At the equator the stars rose at right angles to the horizon, followed an arc of a circle across the sky, and set perpendicularly. In addition, every star in the firmament (except the earth, for the observatory was on the side which never faces it) was visible at one time or another. The two pole stars lay always on the rim of the horizon, while all the rest circled about them, showing themselves for half of each twenty-eight (earth) day revolution.

The polar axis of the telescope was connected to an enormous driving clock, timed to follow the slowly creeping stars across the heavens. Once set going, it required no further adjustment, pursuing the tiny lights as they wended their way in a body from east to west during their two weeks of visibility. The observatory dome also rotated, keeping its broad slit always between the great mirror and the stars on which it was trained.

Quaile examined every detail of the apparatus, uttering exclamations of delight and admiration. We climbed to the observer's booth and, removing our helmets, looked into the eyepiece. The telescope was trained on the star cluster known as the Pleiades, whose familiar "seven sisters" were now mingled with countless thousands of tiny points, dotting the field like raindrops on a pavement.

Quaile decided to try out the telescope himself at once. He secured a number of plates already prepared and returned to the dome. I watched him as he swung the huge tube across the sky, training it upon Mars. He slipped a negative into the plate holder, made final adjustments of the direction and focus of the instrument, and climbed to the observer's station. I watched as he followed the progress of the planet. It was necessary for him to watch it constantly, shifting the photographic plate by a hair's breadth from time to time. The tremendous magnification of the planet's image also magnified imperceptible irregularities in the driving clock, so that the variation of a fraction of a millimeter would destroy surface details in the picture. In starting the exposure Quaile had centered his cross hairs on some minute spot of the planet's disc, and his trained eyes were best able to keep it there.

An Illusion Destroyed

At length he climbed down from the booth and removed the plate.

"That should do it," he said. "Now let's see what we've got." We hastened off to the photographic laboratory, where the plate was carefully developed. A group of assistant astronomers and photographers surrounded us as we bent over the negative. It bore little resemblance to a visual image of the ruddy planet, for in addition to its colorless blackening, bright spots were marked by the deepest shadows, leaving blank patches in place of the darker areas. Nevertheless I realized that it was by far the best piece of work of its kind ever seen. The planet appeared 320 times larger than the full moon as seen with the unaided eye,

so that only a part of its disc was shown on the plate. With a little imagination I could picture myself suspended a bare 750 miles from its surface, seeing it as it might some day look to the venturesome pioneer who first landed there. I looked in vain for the famous "canals"; there were irregular patches of dark color, the more prominent ones approximating straight lines, but that was all. The supposed irrigation system was an optical illusion which disappeared on better examination.

Quaile went back to the observatory to make more photographs. He was immensely pleased with the success of his first effort, and now had the opportunity he had longed for to determine, once for all, what was to be found in the Martian atmosphere.

During the next few days he told of his achievements along this line; and in doing so he blasted one of the most fascinating ideas which mankind has ever invented, namely, the existence of a race of super-beings who had engineered huge water channels to supply melting ice from the polar caps. He found that there was water, true enough, but only as a vapor and in very small amounts, while the total absence of carbon dioxide and oxygen showed conclusively that any such highly developed organism as the human body could never endure there. Without oxygen to breathe and carbon dioxide to retain through the night the meager heat of the sunlit hours, all animal life must have long since succumbed to the rigorous climate.

The results of this investigation only served to increase the impatience of the colony. Did this unpromising news mean that Ganymede, too, was a desert world, devoid of living beings, and that the earth alone was capable of supporting an intelligent race? It was not encouraging, to say the least. Yet if this were true, how to explain the sulphur meteors? We must not jump at conclusions; the riddle would be solved in a short time, and all awaited eagerly the rising of Jupiter and his attendant moons.

Quaile and his assistants were in a bustle of preparation, while Dr. Forscher himself had taken charge of the construction of an

extremely sensitive instrument to measure the temperature of Ganymede's surface. It was a refinement of apparatus used for similar purposes by astronomers, and was based on the fact that when two wires of different metals are joined to form a closed circuit, an electric current is produced by warming one of the junctions. The current could be measured with a delicate galvanometer, and the temperature of a distant body thus computed.*

As the hour of Jupiter's rising drew near, an audience gathered in the observatory. With eyes strained to the east they waited—scientist and laborer, standing shoulder to shoulder, waiting for the consummation of twelve years' efforts. Their voices, magnified by the radio speakers of their envelopes, bespoke the emotions which filled them. There were not a few who held watches in their hands, and by one or another the passing of each minute was announced. A heavy voice from somewhere near me roared a facetious admonition to the Prince of The Solar System not to keep his audience waiting, and there was a ripple of laughter. Then a shout broke through the tumult.

"There he is!"

A instant of awed admiration followed as the yellow dot of the planet's face balanced on the horizon, glowing steadily like a tiny diamond. Those on the outer edge of the group crowded forward to get a better view through the wide opening of the dome. The heavy-voiced joker called for a cheer, and it was given by the over-enthusiastic. Then someone set up a shout for Quaile which was taken up by the group.

"Where's the astronomer? Why isn't he on the job?"

I left the observatory and set off in search of Quaile. He was dozing in his apartment, stretched out in an easy chair. An open book lay heedlessly on the floor beside him; his burned pipe had slipped from his fingers, cascading ashes on the carpet. His face wore an expression of peaceful oblivion

to the question which had fired the imagination of the entire colony.

"Quaile!" I exclaimed. "Jupiter's risen!"

He awoke with a start. "Take it easy, young fella. No rush—Ganymede's eclipsed right now; hiding behind Jupiter like a bashful kid. Maybe it knows we're looking through the keyhole. I was just catching forty winks before I get started. I'll be in for a long pull."

I apologised for my impetuousness. He waved it aside.

"Pull up a chair and chat a minute." I complied.

"This thing's got you all on edge, like the rest of them," he observed. "No doubt they think I'll have the answer in time for dinner. I wish I could, but, y'understand, there's a sight of work to do. I'm going to make dozens of plates; no one of them would tell the story. I'd be missing a bet if I didn't get all I could on the whole system—Jupiter and all the other satellites. Might turn up something from them that would tell us quite a lot. The doctor doesn't want guesses; he wants *proof*."

I could not help admiring the man's quiet, common sense attitude. Why expect results in a day, after twelve years of preparation? And the doctor; he wasn't up there at the observatory yelling for action. No doubt, like Quaile, he was calmly awaiting the most propitious moment for his temperature measurements.

"Can't say as I blame these fellows for getting excited," said Quaile. "I suppose I must get along and start the show." He arose and stretched himself. "Want to come along and watch?"

"Thanks," I said, "but I think I'll do some reading and turn in. You'll have audience enough without me."

"I dare say," he agreed. "I hate to disappoint them, but they'll probably see little enough for awhile."

We set off, he to the observatory and I to my apartment, to kill time as best I could. As Quaile had said, there was no point in anticipating results so soon; Dr. Forscher had allowed the two weeks between the rising and setting of Jupiter as a minimum,

*This instrument, the thermocouple, is easily capable of detecting the heat of a candle a mile or more distant.

and there was no doubt that the two of them would waste no time getting as much data as possible, leaving the examination of it until the planet was no longer visible. Forcing this thought into my mind I settled down to await the passing of the intervening time.

CHAPTER X

What The Telescope Revealed

THROUGHOUT the colony, the air of expectation and impatience continued. At mealtimes there was much speculation as to the progress being made, but no one connected with the observatory was present; they worked almost continuously, stopping now and then to eat or take a few hours' sleep at their posts. The workmen, who did not understand the scientific aspect of the task, could not understand the necessity of so much delay; not a few of them held the view that the inhabitants of Ganymede could be seen directly through the telescope, that it was merely a matter of looking at them to discover their appearance, habits, and such. Having had some practical experience with a telescope in my college days, I undertook to explain the situation to a few who asked me about it, and presently I found myself conducting an informal class in elementary astronomy. I was glad of the opportunity which presented itself to discuss the subject, and lectured in such glowing style that Wiley, who happened in on one of the gatherings, dubbed me "Professor Marland" forthwith.

At length Jupiter disappeared below the horizon, and excitement reached fever pitch. Everyone was on edge, waiting for word of the results. But Quaile and Dr. Forscher had retired to their quarters for a well-earned sleep before doing anything further. And so forty-eight hours more passed and nothing was learned.

During the third day following Jupiter's disappearance, the word passed around that Dr. Forscher would meet those interested in the experiments at his office after dinner. "Those interested" turned out to be almost the entire colony, and the meeting adjourned

to the dining hall, where a platform of tables was improvised and chairs gathered around. Dr. Forscher took the platform. Because of the size and heterogeneous character of his audience, he elected to begin his announcement with an explanation of the experimental procedure. The gathering thus assumed the nature of a popular lecture.

"As you are all aware," he began, "we have been testing a theory which I formulated fifty years ago, and which has been the greatest interest of my entire life. Because of the appearance of certain mysterious meteors, I was led to believe that the satellite Ganymede might be the abode of intelligent, civilized life. Scientists at the time were of the opinion that this was impossible, because of its great distance from the sun. Ganymede revolves around the planet Jupiter once every seven days, three and three-quarters hours, at a mean distance from that planet of six hundred and sixty thousand miles. Its distance from the sun, therefore, is about four hundred and eighty million miles. The earth is less than one fifth that distance, so that Ganymede receives only about one twenty-seventh as much light and heat from the sun as does the earth.*

"This is obviously too slight an amount to support any animal life we know, for the temperature must fall many degrees below zero unless there are modifying factors.

"However, the appearance of the sulphur meteors seemed to indicate that there must be modifying factors. A few figures will suffice to show that too much must not be expected of even our great telescope. Jupiter is at present about four hundred and fifty million miles from us. The telescope magnifies it one hundred thousand times, reducing the apparent distance to forty-five hundred miles. In other words, Ganymede appears to us about fifty-four times as large as the full moon. We have there-

*The intensity of radiant energy such as sunlight is inversely proportional to the square of the distance from the source. Jupiter is 5.2 times as far from the sun as the earth; hence the proportion of light striking it as compared with that reaching the earth is

$$\frac{1}{5.2 \times 5.2} \text{ or } \frac{1}{27.04}$$

fore been forced to adopt indirect methods in seeking the information we desire."

"**M**R. QUAILE and I have been working independently along different lines, and have had no opportunity to compare notes until a few hours ago. Our results are curious, but they are very satisfactory.

"We find that the four major satellites of Jupiter constitute a series much like the four inner planets of the solar system. They appear to show four stages of a progressive evolution from unendurable heat to freezing cold. Some of the phenomena of these stages have already been noted by terrestrial astronomers, notably their density and their *albedo*, or ability to reflect light. The amount of sunlight reflected from any planet depends on the nature of the surface we see. Thus Venus, the brightest of the planets, is covered with clouds which turn back nearly three fourths of the sun's rays, while Mars, with his thin atmosphere and desert surface, can return only fifteen percent. It has been well known that Jupiter's satellites differed among themselves in this respect.*

"Io, closest to the primary, reflects fully half the light which strikes it, indicating that it must be covered by an envelope of clouds, as is Venus. Europa is even brighter. The clouds are thinner, and perhaps broken in spots; certainly they are less dense over one part than elsewhere. As the satellite revolves about Jupiter we note that one part of its face always appears dimmer than the rest. Callisto, the outermost of the four, behaves similarly, its surface being the least bright of all.

"It has also been previously noted that the density of the satellites grows progressively less from Io to Callisto.* The latter would almost float in water, while the former is much like our moon in size and weight. A cubic foot of its soil, on the average, would weigh about three-fifths as much as the same amount taken from the earth. Ganymede, in this respect is intermediate between Callisto and Europa.

"These facts are not new. But let us now consider the work we have just completed. The best measurements of temperature heretofore have shown that Jupiter never rises much above 140 degrees (Centigrade) below zero at the surface, and it has been supposed that the satellites are similarly cold. However, my figures indicate a different situation. The value for Jupiter is substantially correct, but the satellites are much warmer. Why this should be true I am not prepared to say at present, but nevertheless it is so. Io, revolving close to Jupiter, is around 200 degrees above zero—twice as hot as boiling water. Europa shows a temperature of 96 degrees, which is just below the boiling point on earth. It is worth remarking, however, that water boils at different temperatures, depending on the atmospheric pressure. By placing a dish of water in a vacuum it is perfectly possible to have it boiling and freezing at the same time. We cannot be sure, therefore, that there is liquid water on Europa; but with Ganymede such is very probably the case. The temperature is a few degrees above the freezing point. Part of the time, at least, there must be open water on its surface, and from the cloudiness of its atmosphere I venture to predict that streams, lakes and oceans may be found. Callisto is a frozen world, little warmer than Jupiter itself. It would seem that the satellites must receive some sort of energy from that planet, since the reduction of temperature corresponds to their increasing distance from it.

"Turning now to the photographs for which we have labored to build our magnificent telescope, the evidence of a progressive series continues. Mr. Quaile has made excellent photographs of the light of these satellites with the spectroscope, the greatest aid to astronomy since the invention of the telescope. There is a parody on a familiar jingle which runs:

Twinkle, twinkle, little star;
Now we've found out what you are,
When unto the midnight sky
We the spectroscope apply!"

"Mr. Quaile's photographs show that the four satellites we are studying have quite

*Cf. for example pages 369-372, Russell, Dugan & Stewart, "Astronomy," Vol. I, Ginn & Co.

different atmospheres. Io is the hottest, we have found; hence we might reasonably expect active volcanoes covering its surface, which should have cooled only enough to be thinly crusted over with solid matter. Observations of the vapors from erupting craters have shown us what to expect in the air of such a world,* and our spectroscope bears out the prediction. There is no oxygen whatsoever, but in its stead quantities of carbon dioxide, and choking poisonous gases such as chlorine and carbon monoxide. I hardly need point out that life in such an atmosphere would be impossible. Chlorine helped to make the World War the horror it was, and the frequent deaths from minute quantities of carbon monoxide in automobile exhausts indicate the unfriendliness of the latter to living creatures.

Life Discovered

“EUROPA is not much better off. The atmosphere is denser and better able to support clouds of water vapor. Volcanic gases predominate, though not to such an extent as on the sister satellite, as there is enough oxygen to reduce some of them to harmlessness.

“On Ganymede the volcanic activity is unimportant, if not entirely absent. Sunlight, heat, and growing plants have split up the carbon dioxide into carbon and oxygen. As on the earth, nitrogen forms the rest of the atmosphere. This world has passed the destructive youth of its two smaller sisters, and has blossomed in motherhood.

“Callisto is the spinster of the quartet; she has passed into sterility without ever being capable of supporting life. Her frozen face is thinly covered with a layer of nitrogen, from which carbon dioxide, water and oxygen have departed to unite with other elements or litter the ground with snow.”**

“To sum up, then: Ganymede is the largest and most massive of Jupiter’s satellites.

*According to Svante Arrhenius (“The Destinies of the Stars,” Chapter V; G.P. Putnam’s Sons) the following gases have been found in the vapors of several volcanoes: carbon dioxide (over 50%), carbon monoxide, nitrogen, hydrogen, chlorine, sulphurous acid, and traces of others.

In its atmosphere we find all the conditions essential to life—water, oxygen and carbon dioxide, in the proper proportions. The temperature is mild, and there are bodies of open water. Volcanic activity is much reduced, and the poisonous gases are gone from the air. Plant life is indicated by the presence of free oxygen, which it helps to produce.

“To these facts add the appearance of meteors which cannot be the work of nature, at intervals which correspond exactly to the length of Ganymede’s day, and there can be little doubt that a race of intelligent beings lives here, building machines, investigating nature’s ways as we do, and seeking to tell us of their existence and interest in us. Common courtesy requires that we make an attempt to acknowledge their message. It is to that end that I shall now turn the resources of this colony.”

As the doctor finished speaking a hubbub broke out over the room. There were scattered cheers for the inhabitants of Ganymede, for the doctor, and for Quaile. But the scientific group was more interested in the last remark. Communication with an unknown race on another world hundreds of millions of miles distant! How was it to be accomplished? Did the doctor intend to fire sulphur meteors back to Ganymede, and thus let them know we recognized their interest in us? Possibly, though that seemed a rather unsatisfactory means of intercourse. Perhaps a better method would be to prepare a manuscript with a key to the language and shoot it at the satellite; but what were the chances of its ever fall-

**A question naturally comes to mind: why should the moon be devoid of air, while these worlds, on which the force of gravity is nearly the same as here, have dense atmospheric envelopes? For answer we must turn to a theory known as the Kinetic Molecular Hypothesis. From it we learn that a gas is not a continuous fluid, but is composed of tiny particles in rapid motion. Their speed depends on temperature, the hotter the gas becomes, the faster they move. With sufficient heat, some of them are always flying away into space, never to return. The sun warms our moon to the point where all the atmospheric gases would have gradually leaked off, once the volcanoes were dead. This must also be the case with Io, but more gas is always coming from its active craters. Europa’s lower temperature permits fewer molecules to escape; thus we find a denser atmosphere. Ganymede and Callisto are cool enough so that only the lightest gases have departed.

ing into the right hands, even supposing it was not captured and engulfed by Jupiter?

AS these thoughts ran through my mind, I discovered that the scientific staff was following Dr. Forscher out of the dining hall, to his office. Wiley was among the group and motioned me to join them, so I fell into line, wondering what was in the wind. We entered the doctor's office and assembled about his desk.

"I have asked you here," he said, "to offer suggestions as to the best means of communicating with the inhabitants of Ganymede. I should like to see this accomplished before I am forced to retire, so let us waste as little time as possible in devising a method. Have you any suggestions?"

One of the group, whom I recognized as Alvin Dalton, a chemist of considerable ability, spoke.

"It would be quite possible to make a meteor which would behave like those you saw fifty years ago," he said.

"Undoubtedly," agreed the doctor, "but there would be too great a difficulty in aiming it properly. The attraction of the earth is sufficient to capture a projectile which comes fairly close to it, but in shooting at Ganymede we should have to aim much more carefully, or Jupiter's tremendous gravitational field would pull it in. Then, too, I would prefer something which would lead to an interchange of messages."

"Such as radio?" asked a member of the staff of physicists.

"No good," put in Wiley. "We could never make a wave reach that far. The best that's been done yet is to send a message around the earth. To reach Ganymede the waves would have to be sixty-four million times stronger."

"And even if they got there, how do we know the Ganymedians would have an apparatus to receive them?" The speaker was Dr. Ernst, a psychologist.

Quaile, seated at the back of the group, leaned forward through a cloud of tobacco smoke and observed,

"Y'know, that flying machine rather took

my fancy. Couldn't you send it out there and talk to the fellows first-hand?"

"The idea is intriguing," admitted the doctor, "but there are difficulties. None of the tractors could carry enough synthium to go out and back. Even if they could, it would take too long. They are built for a maximum velocity of fifteen thousand feet per second; not that they could not go much faster, for of course there is nothing to hinder them; but at that speed there is barely sufficient time to detect obstructions and avoid them. You had one encounter with a meteoric stone at high speed, Mr. Quaile. Yet at that pace it would require five years to make the trip in one direction."

It was Dr. Langley's turn to offer an idea.

"Suppose the machine were very long, and tapered uniformly. Any small bodies that chanced to meet it would hit a steeply slanted surface, and glance off. There would be no difficulty about building a telescope which could pick up the larger ones in time; and with a gravity screen—"

"Exactly," interposed Wiley. "That would have a great deal of power in getting away from the moon. Then, too, there would be no danger of falling onto Jupiter if we passed too close."

"We're getting on," said the doctor. "I suggest that we let Mr. Wiley and Dr. Langley work out the plans for the machine and show them to me. Perhaps that will be the solution."

Back to our apartment once more, Wiley and I fell to discussing the proposed space flyer. I had imagined it would resemble a torpedo, but Wiley's idea was different.

"The streamline form," he said, "is adapted to travelling in air or water, but it wouldn't suit the purpose of this machine. The idea is to present everywhere the least possible angle to its path, so that a meteorite would glance off readily no matter where it struck. If the machine had a snub nose and curving sides, the front end would be practically flat and there would be no chance for the obstruction to bounce off; it would go right through. What we want is a pointed end; and since the machine must be reversed to stop, both ends should be pointed, something like this."

CHAPTER XI

On To Ganymede

HE sketched the design rapidly. The machine resembled two narrow cones, base to base, coming to a sharp point at one end and cut off at the other to allow for the opening through which the driving gases would escape. The diameter at the middle was about fifteen feet, and the total length about one hundred and eighty.

"Must it be as narrow as that?" I asked. "You don't allow for much head room after you put in a level floor."

"Thinking of submarines?" he queried. "Consider a moment; which way will this thing travel?"

"Why—pointed end first, I suppose," I said.

"Right. And which way will the acceleration tend to push you?"

"Toward the rear," I said. "Of course! The occupants will stand with their heads toward the point. So the floors will have to be crosswise, not the length of the machine."

"Exactly." Wiley continued to sketch the machine, placing the driving apparatus just back of the center, with the generators and cooling apparatus surrounding it, adding storage batteries and air tanks in the slender forward end, and finally the living quarters near the middle.

"That will serve as a preliminary design," he said. "I'll see Langley after a while and get his ideas. Now for some calculations."

He got out his slide rule and table of logarithms, and began filling sheets of paper with figures. Presently he emitted a whistle.

"Here's something to think about," he said. "I'm starting on the assumption that the trip is to be made in a month or less. In order to do that, it would only be necessary to increase the speed one and a quarter feet per second each second; yet half way to Jupiter the machine would be going three hundred miles a second!"

It was my turn to whistle.

"But," I objected, "a velocity like that isn't safe. Suppose it were to meet a rock

as large as ten feet in diameter. It wouldn't be visible in the telescope more than three hundred miles away. That would leave only one second to recognize it and change course."

"True," said Wiley. "We'll have to find some other way of avoiding them."

He dived into the log-book again, and presently came out with a new set of figures.

"If you were to use a larger acceleration—say twenty feet per second per second—you'd save a lot of energy, and get there nearly as soon. In the first two and one half million miles or so you'd reach a velocity of a hundred and fifty miles a second; then you could shut off the power and coast to within two and a half million miles of Ganymede before slowing down. The work done in reaching that speed would be only about a fourth as much as in accelerating all the way."

"Still, a hundred and fifty miles a second!" I exclaimed. "Two seconds to get out of the way of obstructions three hundred miles off! That would be an awful strain on the pilot. He wouldn't dare bat an eye; a single slip, and it would be all over."

"Yes," admitted Wiley. "But you've got to get up a pretty good speed, or you'd take too long in getting there. I wonder if some sort of automatic device couldn't be arranged to steer the machine?"

He tilted back in his chair, felt around for a bit of moon-grown tobacco, and filled his pipe. Blowing a cloud of smoke, he gazed into it absently. His fingers drummed on the desk; now and then he seized his pencil, only to lay it down again. Finally he jumped up.

"I'll go see Langley," he said. "He may have some ideas. Two heads are usually better than one on a job like this."

HE departed, leaving me to while away the time. There was a copy of Edgar Allan Poe's "Prose Tales" on our book shelf, and I thumbed through the leaves in search of something worth reading again. "The Unparalleled Adventure of Hans Pfaal" struck my eye, and I smiled in recollection of Poe's idea of inhabitants of the

moon, particularly the little fellow without ears who had visited the earth in a balloon. I wondered whether the Ganymedians would resemble human beings in any way. Dr. Forscher apparently thought not. But what other sort of creatures could possess a high order of intelligence?

I realized the futility of trying to imagine the inhabitants of another world. There was no foretelling the conditions under which they had evolved—their food, their enemies, their social life, the many obstacles they must have surmounted in their upward march. We could not know until the trip to Ganymede was accomplished; and that waited on Wiley's ability to find a safe mode of travel at enormous velocities.

Wiley came in, his face wreathed in smiles.

"*Excelsior!*" he exclaimed. "Or is it '*Eureka!*'? We have it. On to Ganymede!"

"Explain yourself," I suggested.

"As I predicted, two heads are better than one. Langley suggested a photo-electric cell. You may have heard how sensitive they are. I recall an example. Some inventor built a machine for the purpose of sorting beans, which made use of the difference in color of the bad ones and good ones. There was a small lamp which shot a beam of light on the beans as they passed along on a conveyer belt. The white ones reflected enough light to keep the cell working, but when a brown one came along the current through the cell stopped, letting a trap door fall open to drop out the undesirable bean. Unfortunately, however, the machine wasn't much good practically, at first, for it detected beans with finger-prints or specks of dust on them, and threw them out with the bad ones."

I laughed. "But what has a bean sorter got to do with Ganymede?"

"Suppose such an apparatus were placed at the eyepiece of a telescope, and connected to the controls of our space flyer so that it would change its course whenever there was a slight increase in the light ahead of us. The meteors would betray themselves by the sunlight falling on them, and our flyer would be headed off out of danger."

"Good enough!" I exclaimed. "That's

the worst difficulty taken care of. Now we can go ahead."

"Wait a minute," cautioned Wiley. "You haven't heard it all yet. We can depend on the photo-electric detector to pick up objects an inch or so in diameter, but the smallest must hit the machine now and then. The telescope lens would present quite a large surface. Where are we to find an object-glass strong enough to withstand being hit by missiles as large as bullets at a hundred and fifty miles a second?"

"Then why do you say 'on to Ganymede'?"

"We have an idea," explained Wiley, "though it is only an idea as yet. Langley suggests that we make the photo-electric cell sensitive to waves that will go right through the hull of the flyer itself—high frequency waves. We could generate them aboard the tractor and project them ahead of us; then when they struck a meteor some of them would be reflected back to excite the cell. I think it can be done; if it is, we will make plans for an expedition to Ganymede."

The Comet

WILEY demonstrated once more the genius which had aroused Dr. Forscher's admiration. After a month of experimenting he demonstrated the success of his cell. He had set it up on the moon's surface, trained it on the sky and connected to it a light, in such a way that a flash would announce the operation of the cell. We stood by and marveled as he tossed tiny pebbles, filings of steel and such minute objects in the path of the rays, to be greeted each time by a flash of the light. Without a doubt the flyer would be safe from collisions, at least.

From that time forward all eyes looked to the day of departure of the expedition. The construction of the flyer was begun, and progressed rapidly. I assisted from time to time in various capacities as far as my abilities permitted.

Quaile had been given the task of mapping the best route from the moon to Ganymede, and I spent some time helping him. We photographed the section of the sky

through which the machine would travel, seeking unknown asteroids whose presence might hinder our progress. There were a number of them, yet the danger they represented was surprisingly small. All of them were large enough to be picked up by the detector while thousands of miles away; and when one considers that if all the known and imagined minor planets were added together they would not equal the moon in volume, it is not difficult to realize that they are too widely scattered to offer much of an obstacle. Thus we decided on a straight-line course, after allowing for motion of the earth and Jupiter in their orbits.

Meanwhile Jupiter and his attendants were approaching opposition, at which point they would reach a minimum distance of three hundred and ninety million miles. The construction of the machine was pushed to the utmost in order to have it ready in time for that favorable situation. Frequent reports to Dr. Forscher announced the completion of this or that component part, and the whole took shape as if by magic.

Superhuman feats were accomplished, and work which would have required months under ordinary circumstances was done in weeks. At each of my frequent visits to the scene of the assembling I was amazed at the progress. At first there was only the framework, a long naked skeleton of steel; then the covering appeared, section by section, and was welded together in an unbroken, shining armor. Generators, gyroscopes, batteries, tanks, and piping took their places in the interior, while the outside acquired the dead-black gravity-screen, diminutive wings and disappearing skids to be used in gliding through the atmosphere of Ganymede and landing on the ground.

In a time that seemed scarcely believable the flyer was assembled, inspected, and ready for a test. It was designed to carry only five men, and those who had been most instrumental in the building of it had the honor of proving its ability. They were Wiley, Dr. Langley, the chief chemist, the chief of transportation, and Dr. Forscher himself. Quaile and I, together with a large crowd of onlookers stood by to watch. The machine rested horizontally on its skids,

a tiny stream of luminous vapor issuing from the stern. The shining undersurface contrasted sharply with the nearly invisible black of the gravity-screen covering the upper half.

The crew climbed aboard through an air-lock below and disappeared. Shortly afterward the gravity screens slid into position, the skids were withdrawn, and the vapor-cloud grew in brightness, spurting out behind. The machine paralleled the surface for a short distance; then the rear end dropped slightly, and it headed upward in a long arc, pointing vertically upward and receding into the blackness until only the trailing streamer of gas was visible. High above our heads it circled about, dodged to right and left with the agility of a sparrow, performed lightning-like maneuvers. After a time it shot off toward the horizon, dwindled to a tiny speck, and was lost to sight. In a moment we saw it returning; it flashed among the stars, turned end for end, and approached us stern first, retarding gradually. With marvelous expertness it dropped to the ground, shot out the landing-skids, and came to rest a hundred yards away. The passengers appeared, one by one, from the air-lock and approached the admiring group.

“**W**HAT do you think of it?” asked Wiley’s voice from one of the air-envelopes.

“Wonderful,” replied Quaile. “Most astounding! It looked like a comet gone balmy!” Wiley laughed.

“A graphic illustration,” he said. “We might give it a name.”

“*The Comet!*” I agreed. “What would be more appropriate than to name it for the wanderers of the Solar System?”

The suggestion was immediately popular, and forthwith the space-flyer received its christening.

There now remained only the question of who was to make the trip. The number who wanted to go far exceeded the capacity of the machine, and it appeared that Dr. Forscher would have a delicate problem in making the selection. He called an assembly immediately, and there was a large gath-

ering on hand in the hope of hearing themselves named among the lucky five.

"I realize fully the interest which this journey to an unexplored world has aroused," began the doctor. "There are many unique experiences in store for those who undertake it. But I doubt if anyone here realizes the danger involved. Were it not for my own selfish haste to see it an accomplished fact I should never permit the *Comet* to leave the moon until it had been thoroughly tested. But I have confidence in the foresight and ability of its designers, and in view of the satisfactory performance on its trial journey I believe that it may reasonably be expected to reach its destination.

"Much will depend on the resourcefulness of those who man it, however. They will meet situations which cannot be foreseen, and there is always the possibility that they will never return. In view of that fact, I cannot reasonably ask anyone to make the journey who does not sincerely wish to do so." He paused to give us an opportunity to think the matter over, then resumed: "I have selected five men as a crew. Any one of them is at liberty to withdraw if he wishes, and I am sure he will not suffer in the esteem of the rest. There is a disappointment in store for some of you, but I hope you will see the matter as I do.

"There are three men present, all of whom want very much to go, whom I must ask to remain here. They are soon to assume the leadership of this colony, and I do not consider it wise to allow them to risk their lives in this expedition. I refer to Dr. Langley, Mr. Quaile and Mr. Wiley."

I looked around for the members of this trio to see how they took the announcement. Langley, who stood on the edge of the gathering, betrayed no emotion whatsoever. He looked steadily at the Doctor, his face like a mask. Quaile seemed surprised that he had been considered for the expedition at all, and was not upset by the announcement. I reflected that the big telescope was still a novelty for him, and he could content himself with photographing the stars. Wiley, however, was hard hit, for he had counted heavily on making the trip. It

seemed a shame that he should not reap the fruits of his efforts to make the trip possible, but the Doctor was right. He could not risk the loss of so valuable a man.

Dr. Forscher continued: "Those who make up the party must be able to take a hand in the operation of the machine, and must use their time to the best advantage in gathering facts about Ganymede and its inhabitants. The primary object of the expedition is to get into communication with these creatures who probably have nothing in common with ourselves. The explorers will find on Ganymede strange surroundings, unfamiliar social customs, even habits of thought different from our own. They must draw on imagination and reason, rather than experience.

"With that in mind, I have chosen the five men of the party. Dr. von Lichten, our medical adviser, is the first. His training will enable him to discover the constitution of the Ganymedians, the processes of their bodies, and their habits. The second member will be Dr. Ernst, whose ability as a psychologist should help him to an understanding of their minds. M. Lafourchette, the geologist and meteorologist, will examine the soil and climate of Ganymede. Mr. Dalton is well known as a capable organic chemist and has done notable work in zoology and botany in England. He will study the flora and fauna of the satellite. And to take charge of the party while en route and make a unified report of their adventures and discoveries, a man who, while not preeminently a scientist, has had no little training in astronomy and physics and much practical experience as a writer and explorer—Mr. George Marland!" *

CHAPTER XII

The Trip Begins!

THE last announcement overwhelmed me. The Doctor must surely have overrated my ability, to place me at the head of the expedition. But I was immediately surrounded by a group who seized my hands, congratulating me on the coveted opportunity. The other members of the party were

similarly besieged by admirers who pounded their backs and wrung their hands. Dr. Forscher waited until the excitement had died down a bit before adding his concluding words.

"Jupiter is already three days past opposition; there is no time to lose. In forty-eight hours the moon will be in a favorable position for departure, and I ask these five men to be ready to leave at that time. The *Comet* will be stocked with provisions at once, and the members of the party will see that their personal equipment is aboard. That is all."

Forty-eight hours allowed little enough time to get ready for such an undertaking. The five of us scarcely had a minute's rest. Dr. von Lichten pointed out a possibility that had been heretofore overlooked—that the atmosphere of Ganymede might contain bacteria to which the human body was not immune, in which case it would be dangerous to expose ourselves. He suggested that rubber suits be constructed which would enable us to move about easily and talk to the Ganymedians without exposing ourselves, but there was not time enough. Wiley succeeded in devising microphones which could be attached to the air-envelopes, enabling us to hear sounds directly and make ourselves heard, and these had to serve.

I had less baggage than any of the rest, taking only a table of the positions of the known bodies of the solar system and a large supply of writing materials. I searched the colony over for a typewriter, but there was none to be found, and while it would not have been difficult to make one the time was too short. I contented myself with a three-inch pile of paper, a dozen pens and a quart of ink.

Meanwhile the moon pursued her course around the earth, reaching the full phase on schedule. We were on the far side, and consequently the terrain was wrapped in darkness when our little party of five entered the air-lock and shot to the surface. Quite a few had braved the blackness and penetrating cold of the lunar night to see us off; Dr. Forscher, Wiley and Quaile stood at the air-lock of the *Comet* to bid us farewell with a handshake and a word of encouragement.

Wiley's voice was near breaking as he said:

"All the luck in the universe to you, old man." It wasn't necessary to him to say how terribly he wanted to go.

"I'll bring you a Ganymedian for a house-pet," I promised and climbed aboard.

The interior of the machine was divided off into compartments from end to end by heavy bulkheads. The various rooms were cylindrical, connected by a ladder along one wall, and were furnished with tables, chairs, and bunks securely bolted to the floor. The aspect was rather peculiar at present, for the machine lay on its side and the furniture appeared to hang from the rear partition. We deposited our last-minute impediments in the living quarters and assembled in the engine-room.

The operation of the machine had been explained to each man present, but I took charge, having had experience with the tractors. Under my direction they checked over the readings of the various instruments, closed the gravity screen and sent the gas roaring behind us. We hung on desperately as the forward push of the acceleration turned us upright in the room; then a shift of the gyroscopes sent us curving upward away from the moon, gaining speed rapidly.

I took sight of the stars through a periscope at one side, heading the machine straight for Jupiter. Once on our course a non-magnetic compass indicated any deflection. Then we covered all the portholes against the onslaught of meteorites, withdrew the periscope and set the photo-electric detector working. This was connected to the gyroscopes so that whenever it picked up an obstruction in our path it shifted them, sending us off at an angle to our course; then after a few seconds it automatically righted our direction. At the same time a gong gave warning, so that we could hang on to one of the many holds provided and save ourselves from a fall.

DESPITE the absence of gravity we stood firmly on the floor, for the push of the driving gas held us down just as a quickly-accelerated auto throws its occupants backward. There was nothing more to do for awhile except to watch the instruments.

Our acceleration was plotted on a slowly turning sheet of paper—the sort of apparatus used to record changes of temperature by weather stations. It was actuated by a weight on a spring, so that the downward push of the acceleration moved a pen, and any relaxation allowed the spring to draw it back. In the first twenty-two hours we would have covered two and one-half million miles, and would then be traveling at about one hundred and fifty miles per second. From then on we would coast for nearly a month at a velocity unchanged except for dodging meteors, when the synthium would be called into service for a few seconds each time.*

During the first twenty-two hours we kept a vigilant watch over the instrument board, seeking the slightest irregularity, but everything functioned perfectly and except for an occasional lurch sideways as we missed a passing meteor there was nothing to break the monotony.

I had been introduced to the members of the party at the dinner-table sometime before, but until now we had become little acquainted, and as I was in charge of the expedition during the journey I felt it was up to me to discover what sort of men were under my guidance. I took every opportunity to engage in conversation with each, and soon learned that Dalton and Lafourchette were not on the best of terms, having published controversial theories on earth concerning the importance of rainfall in promoting the development of animals. Physically they were almost exact opposites;

the Frenchman was short, dark, slender to the point of emaciation, and possessed of a nervous manner and a fiery temper, while Dalton stood nearly six feet, a corpulent red-faced man who took life casually.

As for the others, Dr. von Lichten, who had resuscitated me after the incident of Wiley's and my capture, was taciturn and inclined to keep to himself, while Dr. Ernst, the youngest of the lot, was the best mixer. He was German by birth, of Hebrew extraction, and possessed a remarkable insight into the human mind. I decided that I should prefer his company to the squabbles of Dalton and Lafourchette, or Dr. von Lichten's perpetual silence.

“Help!”

M EANWHILE the *Comet* flashed on through the blackness with increasing speed, leaving the moon far behind. We arranged a schedule of watches in the engine room, and those off duty stowed their baggage and made themselves comfortable. There were provisions against the month of travel ahead of us, such as playing cards, chess men, and works of fiction which had been borrowed for the trip. The journey promised to be tedious, for we must travel absolutely blind, not daring to risk leaving any of the port holes open. We would miss many interesting sights, but we consoled ourselves with the thought of those which awaited us.

The two and a half million-mile point was reached without incident; the power was shut off, and we were suddenly free of the pushing acceleration. Unavoidably we floated off the floor, bumping against whatever happened to be over our heads. We hastened to put on magnetic shoes like those Wiley and I had used. Some of the party were amused or disturbed over the weightless sensations at first, but quickly overcame their annoyance.

Dalton was due for the next watch, and presently looked at his time-piece and went into the engine room. The door remained open, and we heard his voice mingled with Lafourchette's voluble accents. I was about

*It is a common impression that power must be continually applied to maintain a constant speed. One thinks of his automobile; if the engine is stopped, the car will presently come to a standstill. But a reference to Newton's first law of motion will explain the situation. Briefly it states that a body in motion will continue in a straight line indefinitely unless compelled to alter its motion by some force acting on it. In the case of the automobile there are always forces at work; the resistance of the air and the friction of its own moving parts against each other or on the road. The faster the car goes, the greater this resistance becomes, until the power applied by the motor just balances the other forces, and a state of equilibrium is reached. But if the power is cut off, the resisting forces tend to slow the car down until it eventually stops. Out in space there were no forces to retard us; the attraction of the sun, moon and planets was cut off by the gravity screen, and even if it were not, its effect would have been so minute as to be indistinguishable.

to investigate when the Frenchman came through the door, muttering.

"What's wrong?" I asked anxiously.

"Nothing," was the reply. "Monsieur Dalton is annoyed because I see fit to take a nap."

"But man, that's dangerous!" I protested. "Suppose something should go wrong while you were asleep. We might all be killed!"

"That would be very bad," yawned Lafourchette. "I am sorry; I shall be more cautious in the future." He rolled into bed and was fast asleep in a few seconds.

We had been our way eleven days when the little Frenchman's second escapade aroused our excitement. I noted with mild curiosity that he had carried a mysterious bundle with him to the control room. I gave little heed at the time; but when, at the end of his watch, I went to relieve him, he beckoned to me in evident excitement. I closed the door and inquired what had happened.

"I have made a great discovery!" he said. "But we must keep it a secret between ourselves, and let no one else take the credit.

"What is it?" I asked.

"The Fitzgerald contraction theory. I have proved it false!"

"Then you've been making experiments on it?"

He nodded. "I have brought with me the most accurate micrometer in Dr. Forscher's laboratories. Before we left the moon I measured several steel bars with great precision. Now we are moving forward at the rate of a hundred and fifty miles a second; according to the contraction theory these bars should be much shorter when they are placed in the line of our motion, than when they are at right angles to it. Yet that is not the case. They are always the same length!"

I suppressed a desire to laugh.

"My friend," I said, "you overlook a simple fact. As you say, the Fitzgerald contraction theory states that a moving body contracts in the direction of its motion; and it is true that your steel bars should be shorter when you point them along our course. But the theory does not exempt micrometers; yours must also be shorter,

to the same extent, and of course you cannot measure the contraction when you're measuring instrument is moving at the same velocity."

Lafourchette's face fell.

"But then how can the contraction be discovered?" he asked.

"You must make your measurements on some body which is moving past us, or past which we move. In either case you would observe the contraction. The motion is only relative."

"Then I can still do the experiment!" said Lafourchette joyfully. "I have a small telescope with me. I will set it up in the air lock, open the outside door, and look at the planets past which we are sweeping. Should they not appear distorted—contracted sidewise?"

"They should," I agreed. "We are entering the region of the asteroids, and will shortly pass close to one of the largest. The orbit of Pallas surrounds that of Mars, and the asteroid itself is only a few million miles from us."

Lafourchette rose. "I shall examine it at once," he declared, and disappeared in excitement.

I TURNED my attention to the controls. As we were among the asteroids it was important that our detector be kept in perfect order, to prevent hitting any of them. Pallas lay many miles off our course, but there was no telling how many fragments of some miscarried world lay ahead of us. Even at that moment the warning gong indicated the proximity of one of them, and the quick shift of the *Comet's* direction pitched me against the wall.

An hour or so later Ernst entered the control room.

"I'm worried about Lafourchette," he said. "He put on his envelope and went into the air lock with a telescope. He hasn't come back yet. Do you know what he's doing?"

"He wanted to make an experiment, which he pledged me to keep a secret. We'd best not interrupt him."

"Nevertheless," said Ernst, "I'm worried."

"We can talk to him with the radio of one of the envelopes," I suggested. "Just ask him if he's all right."

Ernst put on one of the helmets and called Lafourchette's name. I caught the frenzied response:

"Help!"

"What's the matter?"

"Come quick! *Mon Dieu*, I cannot get back!"

"Take the controls," I said. "I'll go see what the trouble is." I climbed into my envelope, closed the outer door of the airlock and entered. Lafourchette was nowhere to be seen! Exhausting the air, I reopened the outer port on an amazing spectacle. Floating parallel to the *Comet*, a hundred feet away, Lafourchette was struggling and kicking frantically in a vain effort to pitch himself toward the air lock.

"I'll throw you a rope!" I called, and banging the port shut I heaved mightily on the inner door. It would not give until I had equalized the pressures, and I was forced to wait until enough air had hissed in through the valves. Inside, I set about a frenzied search for a coil of rope, finally unearthing a stretch of stout metal cord. I fastened one end about my waist and returned to the air lock. Lafourchette had calmed his struggles somewhat.

"Catch this!" I shouted, heaving the coil into the blackness. But I had unconsciously thrown high to allow for gravity, as on earth. The cord missed him by twenty feet, remained stretched snakily and refusing to come closer. I hauled in and tried again, this time with better success. Lafourchette seized the free end and I pulled him aboard. He was on the verge of collapsing, whether from fright or exposure to the intense cold I could not tell. I carried him inside, where we stripped off his envelope. He gasped violently several times.

"What happened?" we demanded in chorus.

"I went out to look at the asteroid," he said, struggling for breath. "Suddenly the bell sounded, and the *Comet* swung side-

wise. I had no chance to catch something for a hold; the machine just floated from under me, and I was left in space. A little later the *Comet* straightened out and sailed right along beside me. I tried to kick myself back, to swim, anything at all, but it was in vain. Ah, my friends, the aggravation of it! There was I, a hundred feet away, yet unable to come any closer. Then, to make matters worse, the air pressure in my envelope began to fall. I was nearly suffocated when you threw the rope. The fabric must have burst somewhere."

I looked over his flexible covering carefully, but could find no break. Dr. von Lichten picked up the helmet, and emitted a whistle.

"Look at this!" he exclaimed. "A hole clear through both front and back. You hit a tiny stone, my friend, which would have drilled you more neatly than a bullet had it touched your body. You may indeed thank your lucky stars that you are still with us."

"That is what I do not understand," said Lafourchette. "With the machine speeding along at one hundred and fifty miles per second, why was I not left behind?"

"When you fell overboard," I said, "you, too, were going a hundred and fifty miles per second. There was nothing to stop you —no air, no gravity; you just kept on going. You could have floated beside us indefinitely, unless the *Comet* swung away again."

"Then my telescope is still beside us?" he asked.

"Unless it was hit by the meteor which caused the *Comet* to dodge. Shall I try to get it for you?"

"No," said Lafourchette. "Let us take no more risks outside the machine. Besides, I have seen all I wanted to."

"Did you find the contraction?"

"No! That accursed asteroid was perfectly round!"

"Perhaps we can estimate how much of a contraction there should have been," I said, figuring on the back of an envelope. "At our velocity, Pallas' disc should have ap-

peared out of shape by about three parts in ten million."*

"Then I could not have seen it, after all," said Lafourchette sadly.

"True. In order for the contraction to become appreciable, our velocity would have to be comparable to the speed of light. That is why it is so hard to believe the Fitzgerald equation. If we see a railroad train rush past without appearing a bit shorter, we are apt to say to ourselves: 'This contraction business is the bunk!'"

Lafourchette had regained his normal composure. "At any event," he said, "I have learned a lesson. I shall stick to my own science, and refrain from questioning theories which have been developed by competent physicists until I am sure of the ground I stand on—scientifically and personally."

The days went on, marked only by the revolutions of our clock. Each passing hour reeled off half a million miles, eating up the distance to our destination. My calculations showed that we had only a few million more to go. I decided it would be safer to begin slowing down a little ahead of time, to allow a margin of safety. Our terrific speed made it unsafe to use the periscope, for a grain of dust such as had pierced Lafourchette's helmet would wreck it, and interplanetary space was more or less filled with such particles. After figuring our position as accurately as possible by dead reckoning, I allowed a million miles to spare. None of the satellites would bar our path, but Jupiter lay dead ahead, and we had no desire to plunge into his atmosphere. After slowing down to a safe speed we could take observation and alter our course so as to meet Ganymede at the proper time.

Nearing Jupiter

THE hour of starting up the driver would come during Lafourchette's watch. I offered to stand it as well as my own, but he insisted on taking his turn. Dalton had referred to him as "sleepyhead" since his first offense and his pride was hurt. Accordingly I set about writing up the log

of our journey. Dr. von Lichten was asleep in his bunk, and Dalton and Ernst were at one of their innumerable chess games, having "loaded" the board and the chess-men with magnetized iron so that they would remain in place, despite the lack of gravity.

This last circumstance made my writing difficult, for I had to lean against the wall, and my ink showed a great disinclination to stay in the bottle. To add to my discomfiture I found myself unable to collect my thoughts. I wrote a word, crossed it out, and re-wrote it, unable to make up my mind. I became increasingly drowsy, and finally fell into a doze.

I awakened with a hazy realization that the gong connected to the detector had rung. My head must have knocked sharply against the wall, though the throb of the blow seemed far off and unimportant. My glance fell idly on Ernst and Dalton, standing at grotesque angles sound asleep beside their chessboard. The spectacle was amusing, but slowly I realized that something must be done. With painful slowness I dragged my feet into the engine-room, and found Lafourchette blissfully unconscious. I peered drunkenly at the instrument board, my befogged brain unable to fathom the meaning of the many indicators. Slowly I grasped the fact that the air was horribly foul. I struggled toward the emergency oxygen tank and wrestled with the valve until it gave, pouring the life-giving gas into the room. Standing near the tank I inhaled deeply, and soon recovered my strength. Then I grabbed Lafourchette by the shoulders and dragged him to the valve. It was a minute or so before he recovered consciousness, protesting that he had been asleep only a moment. I looked at the clock. We should have begun slowing up two hours ago!

Yelling directions at Lafourchette, I set the gyroscopes turning and reversed the

*The equation for the Fitzgerald contraction is $L = L_0 \sqrt{1 - \frac{v^2}{c^2}}$. L represents the length of the body in motion, L_0 the length of that body at rest, v the velocity of the body when in motion (or the relative velocity between the body and the observer), and c the velocity of light. Putting these values in the equation, it becomes $L = L_0 \sqrt{1 - \frac{22500}{345600000000}}$ which comes out $.999997 \times L_0$, a contraction of .000003.

Comet. In another second the gas was shrieking through the discharge tube, the sudden acceleration sending me to my knees. We rushed into the living room, to find Ernst and Dalton sprawled on the partition and Dr. von Lichten half out of his bunk with his feet tangled in the covers. We disentangled them and hauled them into the engine-room. There, lying by the wide open oxygen valve, they quickly recovered consciousness, asking in great bewilderment what had happened. I exclaimed briefly that the oxygen apparatus had got out of order, and the bad air had rendered us all unconscious. Dalton raised up and pointed an accusing finger at Lafourchette.

"Sleepyhead!" he shouted. "Dreaming on the job again. No thanks to you that we're all not dead now!"

"From those unmentionable cigars of yours," retorted the Frenchman, "it is a wonder we have not been asphyxiated before!"

I intervened, to stop further argument.

"We are going too fast for safety," I said, "with Jupiter less than two and a half million miles away. I've had to reverse the *Comet* by dead reckoning. The detector isn't turned around yet, so we are unprotected from collisions. I'll have to take a chance on using the periscope to get our bearings."

This was a risky proceeding, though the streamer of gas rushing out ahead of us offered some protection against small dust fragments floating in space. I uncovered the tube and extended it enough to get a view of the path ahead of us.

For a few seconds the flaming streamer of gas from the disintegrating synthium blinded me. Then, through the brilliant blue-yellow haze, I caught a glimpse of something which froze my stomach—a shining circle!

In one bound I reached the gyroscope controls and swung the *Comet* off at a tangent. The others had sensed my panic and stood motionless. Five—ten—fifteen seconds passed; nothing happened. I returned to the periscope just in time to see

the pitted surface of one of Jupiter's tiny outer satellites sweep past, seemingly only a stone's throw away. In reality we had missed it by a mile or more; yet our terrific speed reduced that distance to a hundredth of a second in time. By so small a margin had we missed ending our journey prematurely, a tangled mass of heated metal, against a pigmy member of the Jovian system, so small as to be visible from earth only in the very largest telescopes.

Incongruously enough, I roared in half-hysterical laughter. The wave of relief which swept over me reduced me to uselessness for the moment, but Dr. von Lichten retained the presence of mind to swing the beam of high-frequency waves which actuated the detector ahead of us, thereby preventing the possibility of another such encounter. Then I looked out again, to straighten out our course.

Jupiter lay off to the right, with Ganymede beyond, moving majestically along in its orbit. Now that we had our bearings once more, we could change our course so as to meet it at the far side of its path, heading close to Jupiter on the way. I explained the situation and told the others of my decision. Then we made sure that the gravity-screens were in position and the portholes all tight, for it would not do to expose ourselves to Jupiter's attraction at the short distance we would pass him. We agreed that for the rest of the trip two of us would always be present in the engine room, and Dalton and I volunteered for the first shift.

It was not necessary for both of us to watch the instrument board constantly, so I took the first turn. Between us we were to stand an eight-hour watch, during which time we would reach our minimum distance from Jupiter. The realization of that fact kept me constantly alert for the slightest variation in the instruments, but there was none. We continued our rapidly slackening flight, rushing toward our destination, nearing the belted planet around which Ganymede revolves. At the end of four hours Dalton relieved me and I set about recording the latest incidents.

CHAPTER XIII

Signs of Danger

WE must have been about half a million miles from Jupiter's surface when Dalton remarked:

"The acceleration indicator's a little high."

I walked over to the instrument board for a look. We were slowing down a little too much; the needle had risen two-tenths of a foot per second on the scale.

"No harm in a little deviation like that," I remarked, as I slipped the controlling rheostat into the next notch and resumed my place. In a half hour more our angling course carried us a hundred and fifty thousand miles closer.

"Acceleration's up again," said Dalton. This time the indicator had risen three-tenths of a foot. I again corrected the discrepancy, wondering at the steady increase. Dalton spoke again.

"It's getting hot. The thermometer's up three degrees."

"Probably from the extra heat of the driver," I suggested.

In the next few minutes all the instruments began to misbehave slightly. The gyroscope compass indicated that we were a fraction of a degree off our course, toward Jupiter; the temperature continued to rise; the photo-electric detector went into action with remarkable persistence, shifting our direction about continuously and at random, and the acceleration crept up again.

These disorders were no serious but they were unexpected and disturbing. Furthermore, when I again cut down the acceleration I realized that the sound of the gas had unquestionably diminished from its usual note. The synthium was not overworking; some other force was holding us back! The temperature of the interior rose until we had to shut off the electric heaters; the detector sent us skipping about with alarming frequency, and our course tended more and more toward Jupiter. Could it be that his atmosphere extended as far out as this, and that we were encountering its

outer limits? That would account for the heat of the *Comet* and the increased retarding.

As we approached our nearest point to Jupiter it became apparent that this was not the explanation. The detector misbehaved so badly that we were forced to shut it off at the risk of a collision, while all the electrical apparatus acted queerly. There were strange noises from the headgear of the air-envelopes, due to the static disturbances broadcast by their receivers. Even without the electric heaters the temperature inside the machine rose steadily; the acceleration continued to increase, and our course had to be constantly corrected to prevent our heading straight for Jupiter.

The simple explanation of these phenomena dawned on me in a burst of comprehension. We were in a strong magnetic field! Nor was I too long in discovering its source. The earth, three hundred times less massive than Jupiter, has an easily recognized field which has been used for centuries to guide mankind by its effect on the compass needle. In view of Jupiter's great size, was it surprising that he should have a field many times stronger? Given that, the electrical and other phenomena followed as a natural consequence.

Let us refer for a moment to the effect of moving a metallic conductor near a magnet. Under certain circumstances there will be a current induced in the conductor, and according to the law of Lenz, this current tends to oppose the inducing influence. There is a simple rule for remembering the relation of these effects. Extend the right hand with the index finger straight ahead, the thumb vertical and the middle finger pointing to the left. The middle finger indicates the direction of motion, the thumb that of the magnetic field, and the index finger the flow of current from positive to negative. The shell of the *Comet* was a good conductor of electricity, and the induced currents, eddying through it, opposed our motion, expending their energy in slowing us down and heating up the interior. The wiring of the detector experienced a similar flow of current, which sent us dodging hither and thither, while the ir-

regularities of the field announced their presence in the squawking radios.

"This is about as close as we'll get," announced Dalton from the instrument-board. We were just outside the orbit of Io; the magnetic disturbance had reached its height. In a flash of inspiration I saw the answer to the puzzling heat of the satellites. They too experienced Jupiter's strong field; they were doubtless able to conduct electricity as well as the earth; the vast eddy-currents in their interiors must give rise to high temperatures which could not have otherwise existed.

Ernst and von Lichten, who presently relieved us, had noted the behavior of the *Comet*, and were considerably upset. But my explanation set their fears at rest and they accepted my prediction that the annoying situation would disappear as we drew past Jupiter.

When my next turn in the pilot-house came, we were moving slowly enough to permit use of the periscope without danger. Ganymede lay to our right, a brilliant, dazzling moon. Beyond and somewhat above was Callisto, smaller and paler. I turned the glass about. The tremendous shadow of Jupiter's dark side hid a generous circle of the sky, bounded on the left by a gigantic crescent. The sun, as always, shone among the countless stars, but it was a shrunken, discouraged orb of day whose face lighted these far-off worlds.

Close by him, in the constellation of Libra, was a star of the third magnitude, insignificant except for the fact that it had no place in the familiar order of things. This was the planet men like to think the most important spot in the universe, to call the home of God's chosen ones—the earth!

(To be continued)

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All These and More in the

FALL 1930 WONDER STORIES QUARTERLY

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The Soulless Entity

(Continued from Page 855)

man listened incredulously but she allowed him to finish.

"Your man is now a machine," concluded the doctor, "and as far as you are concerned he is dead."

The woman jumped from the cot in wild hysteria. She ran about the room crashing things and cursing.

"You are all damn liars," she shouted, "hell-hounds and liars." She fell upon Otto and the doctor who were trying to quiet her and bit and tore and scratched. She struggled and fought, until, panting and all but exhausted, she fell to the floor. The room was a wreck.

Finally she looked up at the doctor like a dumb brute in distress and whined, "Give him back to me, will yuh? Aw, go on. Give him back to me."

Again the doctor with all patience reasoned with her, explaining that her hopes were futile.

She whimpered for some time. Then she looked up at Dr. Farnum and, with bosom heaving and eyes as cold as steel, said:

"I'll kill you like a dog, the first chance I get. I'll kill you as sure as hell."

"You won't kill anybody," maintained the surgeon. "Remember girl, I brought him back to life and let him live after they had electrocuted him."

She pondered, alternately wiping at her eyes with a bit of handkerchief and instinctively dabbing at her nose with a powder puff. Suddenly she looked up with a queer light in her eyes and moaned, "If it wasn't for you he wouldn't even be breathing?"

"Most certainly not," repeated the doctor. "Now will you go and leave him to me."

"Can't I see him, sometime?"

"What good would it do?"

"Maybe no good but I'd like to see him sometimes."

It was the doctor's turn to ponder. Finally he said: "If you will cut out the rough stuff and settle down and go straight, I'll give you a job taking care of him."

"Will you on the level?" fairly screeched the girl, a strange light in her eyes.

"Absolutely, but you cannot expect anything but his nearness. He will not be alive to your presence."

"I don't care," said the girl happily, and with dog-like devotion, "I'll be near him."

"That you will," agreed Farnum.

And so began the strangest part of the unearthly case. Day in and day out the gorilla girl, losing interest in all else, attended the mechanical man tenderly.

Hand in hand they could be seen walking about the surgeon's garden. The girl, her criminal spirit broken, lived only for the shell of a man who had once been her nearest associate and lover. What solace she got from such companionship probably only a woman can explain but she appeared almost happy at times.

This strange situation endured through many months; but the surgeon, keeping close observation of both the woman and the man-machine, noted that the gorilla girl's health was failing. She seemed to have lost all interest in life.

Then the end came. Suddenly and tragically it happened but on reflection Farnum realized that it was in keeping with the other events in the weird chain. Dr. Farnum missed a quantity of a deadly poison from his stores. Divining that she had helped herself to the drug, he rushed to the little rooms over the garage.

There he found them—lying together on the one cot, the gorilla woman and the man-machine, dead in each other's arms. On the table was a note, and it read:

"I always felt helpless unless I was fighting, but it ain't no use—no use at all. I can't fight anymore. A woman can't go on forever like this. He's the only thing I got and he's dead, all but the wires. So I poisoned him and will kill myself. I'm sorry we both didn't do right. We could have lived on what we earned working but we didn't. We thought we was so wise. We called everybody dumb-bells and suckers. Well—God help us. Good bye,

Dorothy Borsovich-Solokoff

She had claimed the man's name in death. The signature wavered a bit but it was legible.

The Gland Men of the Island

(Continued from Page 843)

I broke off suddenly. The ground beneath our feet was shivering and heaving, and for a moment, I doubted the evidence of my eyes. The next moment it was still again, and I was about to ridicule the idea when Follansbee grasped me by the arm.

"Did you feel that?" he said, "For God's sake, get that launch on the water. There is going to be a lot of funny things happen here before long. Come on."

In less than twenty minutes we were in sight of the ship once more and then it was that Follansbee made the final remark,

"Not a word about our adventures," he warned, "I'll get Sparks to radio Port Moresby for a destroyer to clean up that Island. I suppose that it will be necessary to give them a bare outline."

And I turned to see the foreshore of the Island, still brooding and sinister, disappearing into the tropical night.

THE END

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THE FEBRUARY ISSUE
ON SALE JANUARY 1, 1931

There is but one incident worth while recording, however, and it took the form of a radiogram that Follansbee received after his detailing the story to the Naval Authorities at Port Moresby.

"Searched water for some time in latitude given. Find no trace of Island. Suspect some elaborate hoax. Am temporarily dropping matter."

What is the explanation of that message. Can it be, as Follansbee informed me, that Ho Ming made his headquarters on one of these roving islands that are never in the same place for any length of time? Were the mysterious tremors we felt forerunners of another upheaval?

And if that is so, I often pause to think of the misguided genius that lies fathoms deep in the ocean and the terrible formula that must remain a secret till the sea gives up its dead.



Science Questions and Answers



THIS department is conducted for the benefit of readers who have pertinent queries on modern scientific facts. As space is limited we cannot undertake to answer more than three questions for each letter. The flood of correspondence received makes it impractical, also to print answers as soon as we receive questions. However, questions of general interest will receive careful attention.

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Atomic Energy and the Steamboat

Editor Science Questions and Answers:

Would you please answer for me the following ques-
tions:

1. Is uranium a radio active metal?
2. What is the actual speed of sound?
3. How would you disintegrate an atom and what
would be the method of application, say to a steam
boat?

Albert Wiggin,
1514 Wayne Ave.,
Lakewood, Ohio.

(1). Uranium is one of the most radio-active of met-
als. Like radium, uranium disintegrates almost sp-
taneously, though slowly, into alpha and beta parti-
cles and leaves lead as a remainder. It also shoots
off into space as a result of the disintegration, as does
radium, the short gamma rays.

2. The speed of sound varies in the different medi-
ums. About 1100 feet per second may be accepted
as a fair average value in air.

3. Many methods have been proposed for disinte-
grating the atom. Some scientists propose to speed
up the electrons so that they shall finally acquire
enough of a speed to break loose from the proton; others
want to use a physical contact, by bombarding
the atom with tree electrons and so knocking some of
the electrons loose; others want to cause the disinte-
gration by pulling the proton out of its atom.

The latest theories however indicate that the re-
lease of atomic energy will not come from the dis-
ruption of the atom. Millikan and others believe that
it will require just as much energy to disrupt the
atom as it would provide. Millikan states that atoms

mic energy is released by the building up of one kind of atoms from others. In far distant suns, for example, atoms of hydrogen are being disintegrated and rebuilt into nitrogen atoms. Fourteen atoms of hydrogen with a total atomic weight of 14.012 will be built up into an atom of nitrogen with a weight of 14.008. There is left over then a difference of 0.014 atomic units which is available energy. How this energy can be utilized is still problematic. If the energy is released in the form of heat it may be ap-
plied to a gigantic boiler. If it is kinetic energy it
might be used to turn the blades of a gigantic tur-
bine. But in any case the amount of energy involved
will be so terrific that it can only be applied on
some tremendous scale.—Editor)

Spectra

Editor Science Questions and Answers:

Would you kindly answer the following questions:
1. I understand that the rays of light from a star
on striking a prism are broken up into a spectrum.
How does the prism do this?

2. Is a rainbow a rough spectrum of the sun,
and if so do the raindrops act as the spectroscope?

3. Having come from a swim lately I opened my
eyes under water for a considerable length of time
and noticed a circular rainbow around an electric
light. Was this a rough spectrum of the light?

Robert Bruce Baldwin,
1437 Judson Ave.,
Evanston, Ill.

(1. Ordinary white light that is emitted from most
radiant bodies such as the sun and stars is composed
of all the colors in the spectrum from red to violet.
These colors have each a different wavelength, the

red having the longest, and the violet the shortest. When the light strikes a prism the waves are bent twice, once on hitting the prism and again on leaving it. The different wave-lengths, being bent or refracted at different angles, are thereby separated out and we see each color individually.

2. Yes, the raindrops reflect, refract and disperse the sun's light, and acting as a prism they break up the sun's light into the component colors. But a prism is not a spectroscope. A spectroscope is a device for not only showing the spectrum but also for detecting certain elements in the sun or star through which the light passes. In other words in a spectroscope the spectrum is crossed with dark lines indicating the presence in the sun of hydrogen, oxygen, calcium, or other materials. The rainbow, of course, does not show this.

3. Yes, the water acted as a prism to break up the light emitted from the lamp into their component colors.—Editor.)

Perpetual Motion in Space

Editor, Science Questions and Answers:

I note that you answered my questions in the October issue of WONDER STORIES on sun spots and perpetual motion in space. I thank you very kindly for doing so; I wonder if you would answer just one more?

Here it is: You said that motion in space was perpetual, did you not? Well, in that case, why would a rocket, traveling toward some planet or star, need rocket-motors or any other kind of power to move it along after leaving the earth?

C. W. Crede,
219 Roans St.
Charleston, W. Va.

(The planets that have what we called perpetual motion are moving in orbits in which there is no resistance to stop them and the centrifugal force of their motion is balanced by the gravitational pull of the sun. They were originally set in motion by some external force such as the gravitational pull of another sun which passed by our luminary some hundreds of millions of years ago.

Now in order for a rocket to have perpetual motion it must leave the earth and itself fall into an orbit about the earth, the sun or some other heavenly body. The orbit will depend on the size of the heavenly body about which it is to circle, the distance from that body and the speed. Therefore if the rocket leaves the earth, and at a distance of some 500 miles above the earth acquires a speed of some five miles per second parallel to and with reference to the earth, it will have acquired perpetual motion and will circle the earth in perpetuity. Similarly, if it leaves the earth and speeds along in the earth's orbit until it is, let us say, on the other side of the orbit from the earth and it acquires a speed of 18 miles per second, the same as the earth's speed about the sun, it will circle the sun in perpetuity just as the earth does, without further expenditure of power. But power must first be used to raise the body from the earth and give it a definite orbit around some body which it is to circle, otherwise it is subject to the gravitational attraction of the heavenly bodies close to it.—Editor.)

Determining the Densities of Stars

Editor, Science Questions and Answers:

Will you explain to me how it is possible to determine the density of stars?

Willis Rader,
10th Street,
Weisburg, W. Va.

(The density of a body is the amount of matter per unit volume. Therefore if the weight and the volume of a body are known the density can be found.

The method in practice of finding both the weight and volume of distant stars is quite lengthy and complicated, but the following summary is a simple explanation.

When a star's distance is known, and it can be found by triangulation, we can determine how intrinsically bright it is by our knowledge of its apparent brightness. In other words we know how much light reaches us, and by knowing how far away the star is, we can calculate how bright it must be at its source.

We can also determine this by eliminating the loss in radiation how much energy the sun or star is pouring out to us. We also know the output of energy per unit area that reaches us for this depends on its surface temperature which we have determined by thermocouples, etc. From these two figures we can arrive at the number of square inches of surface of the star and so can calculate its volume.

To find the weight of the star, indirect means are the only ones possible except for double or binary stars

whose weights can be found directly. The relationship of the weight of known stars to their other qualities are tabulated and stars are arranged into groups. When the weight of a new star is desired its known properties automatically put it into one of the "weight groups" and so its weight is approximated. From the weight and the volume the density can be found. It is evident that there is much that is relative and experimental in this method of approach.—Editor)

Ultra-Violet and Infra-Red Lamps

Editor, Science Questions and Answers:

Will you kindly answer this question in your questions and answers department?

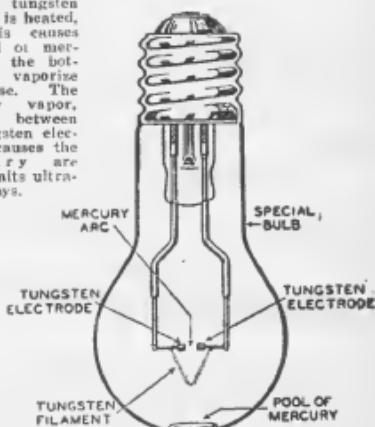
What is the difference in construction between the infra-red and the ultra-violet lamp?

Charles Williams,
7644 So. Michigan Ave.,
Chicago, Ill.

(One type of ultra-violet lamp is an electric lamp that permits the ultra-violet rays to penetrate through the glass bulb. Almost every radiant body such as the sun, or an incandescent electric filament or an arc lamp, emits waves of radiant energy including heat, light, and ultra-violet rays. The ordinary glass bulb prevents the ultra-violet rays from penetrating, just as a glass window stops the ultra-violet rays of the sun from entering a room. By using quartz as the bulb, or in the case of a window, quartz panes,

A new type of

simple ultra-violet lamp. When the current is turned on, the tungsten filament is heated, and this causes the pool of mercury at the bottom to vaporize and rise. The mercury vapor, passing between the tungsten electrodes, causes the mercury arc to emit ultra-violet rays.



the ultra-violet rays can penetrate. Thus a new ultra-violet lamp on the market is merely a high powered electric lamp with a quartz bulb. A more expensive lamp uses a tungsten filament which heats a pool of mercury and causes a mercury arc. This is used because the energy emitted by the glowing mercury arc is rich in ultra-violet rays. A reflector is generally used to concentrate the rays on any given area.

The infra-red lamp, if one may call it such, is merely a coil of heated wire in back of which is a reflector to concentrate the heat rays. The infra-red rays are in other words heat rays. This wire is used in a coil, the current being adjusted so that the coil heats up but not enough to emit much light. The heat waves radiated hit the reflector (generally of a dull copper) which concentrates them and shoots them back in volume to the place which it is desired to heat.—Editor.)

Measuring Stellar Distances

Editor, Science Questions and Answers:

Will you kindly answer the following:

1. How many light years is the North Star distant from us?

2. How can the distance of a star be measured?

Richard Kindig
3811 Federal Blvd.,
Denver, Colo.

(Continued on Page 901)

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Occupation _____



The Reader Speaks

In this department we shall publish every month your opinions. After all, this is your magazine and it is edited for you. If we fall down on the choice of our stories, or if the editorial board slips up occasionally, it is up to you to voice your opinion. It makes no difference whether your letter is complimentary, critical, or whether it contains a good

old-fashioned brick bat. All are equally welcome. All of your letters, as much as space will allow, will be published here for the benefit of all. Due to the large influx of mail, no communications to this department are answered individually unless 25c in stamps to cover time and postage is remitted.

A Letter from the German Interplanetary Society

Editor, WONDER STORIES:

We wish to give the readers of *WONDER STORIES* some news about the "Verein für Raumschiffahrt" (i. e. Society for Spatial Navigation or Interplanetary Society of Germany) and first to thank Mr. Illo Gernshack, for the kindness of publishing this.

The officers of the German Interplanetary Society have gone through a number of weeks of very hard work. We have succeeded in securing near Berlin a suitable rocket flying field, a large field on which the starting supports for the different rockets were set up. There are likewise several buildings, which are now being equipped with machinery, so that next year we can work on a very large scale.

In the meantime important rocket experiments have been performed by the technicians of the Society, the engineers Nebel and Kiedel—experiments dealing with the combustion of liquid fuels (gasoline) with liquid oxygen; experiments on the ignition of liquid rockets; on the stabilizing of rockets in flight; on the arranging of the fuel chambers, and on the rocket parachute, which brings the burned out rocket safely back to earth.

It is a great pleasure for us to be able to say that all these experiments, despite their great difficulty, have been successful. Ignition, stabilizing and the releasing of the parachute were problems which came out successfully with our experimental apparatus. Details about these experiments will be given in our next bulletin, but we merely want to inform America by these few lines that the German Interplanetary Society has not gone to sleep and that our work has brought the world another step nearer the final goal. This goal is the space ship, as our president, Prof. H. Oberth has shown in the film for which he was advisor, *The Girl in the Moon*.

Willy Ley, Secretary,
Berlin NW 40, Scharnhorststr,
Germany

Those who look forward eagerly to the time when further experiments on shooting rockets into space will be performed, can be heartened by this illuminating letter. Steadily but quietly our German friends are going about the sifting of the possibilities of fuel, design, etc. so that as they say, a space ship will finally result. The mathematical problems have already been settled. We know now what conditions are necessary for a space flight. It is a question then of finding funds and engines that fit those conditions.

After all space flying is too great a matter to be limited by national pride and jealousy. We are sure that all Americans extend their hands across the seas to wish the German Interplanetary Society the best of luck. And we will look forward eagerly to the day of the first "Shot into infinity," no matter what nation or group sponsors it.—Editor)

Something Else to Kill

Editor, WONDER STORIES:

I believe I have been getting your magazine long enough to give you my opinion about it. Your magazine is supposed to be about 95% scientific, but now you are changing it to a travelling zool! For the love of mike take those gosh-darned five million year-old animals out, such as the "War Lord of Venus". The hero could hardly sleep or walk a quarter of a mile without meeting fantastic dinosaurs or something

else to kill. That kind of story is too dramatic, cut it out.

Secondly, more futuristic stories and get something more than wars in those future stories. Thirdly more interplanetary stories. How about a trip to Planet X?

Fourthly, on the new editions don't make the titles too big, and slant it a little up to the right. It spoils the cover as it is now.

Aside from the war stories, *WONDER STORIES* can't be beat. Now, Mr. Editor, I implore you to print this in the "Reader Speaks" and see if many will agree with me. More interplanetary stories and less wars, and may *WONDER STORIES* never succumb.

J. Claude Roby,
Lachute, Quebec.

(Mr. Roby wishes us to put to our readers some questions, one being whether our stories have too much drama, as he complains about in "The War Lord of Venus." Now it is our belief that every red-blooded man thrills to the call of adventure and danger, and when these two elements are combined with mystery and intrigue, then the combination is well-nigh unbeatable. We don't think that Mr. Roby wants us to eliminate drama all together. It is merely a question of how much to inject into our stories. That question we refer to our readers. Shall it be, the more excitement the merrier, or shall stories be more staid. Instead of "doing things" shall our characters sit about a camp fire and talk as the Greek philosophers did, until the first streaks of dawn? Your comments, readers!—Editor)

Kick the Dog Out!

Editor WONDER STORIES:

I'll contribute my little quota of "tripe" or otherwise now. Your change of size goes down all right on this side of the Atlantic, and I chuckled heartily when I saw the "Reader Speaks" was extended.

Shut down the radio, kick the dog out, stop your jaw, you: my *WONDER STORIES* has come, I'm giving myself a treat. I am all there with Mr. H. G. Owen when he utters scathing comment on the "few crabs and imbeciles and sapsheaded kids," excluding Mr. Field Wetherbee. A kid isn't necessarily sap-headed (I'm only 18).

One thing good about your mag. I can read it, type face is clear and all that. I'm a printer by trade so I appreciate it; some mag I can't even be read decently even if the contents are good.

Just one thing, you have these time-travelling yarns, good stuff to read all right, but bunk, you know; because if there's no such thing as time, which there isn't, only change, how can one travel in, or on, something that doesn't exist. To our planet whirling round the sun there is simply a turning and warming of one side and then the other: time, i. e., years, days, hours, minutes, etc., is something purely artificial, invented by man to tell him when to do certain things, work and stop work, etc., especially the stop work part; no offense, Mr. Editor.

Mr. Frederick C. Hehr hit the bull's eye in his Religion vs. Science comments, trust me. No matter what it is "find out for yourself, and don't go off half-cocked." Hear, hear, every time, Mr. Hehr.

Anyhow, Mr. Editor, I don't mind telling anyone, after reading your Mag, I think, "If mags like this are turned out over there, I wish I was an American."

Frank H. Year,
39 Vigo Road,
Andover, Hants, England.

(Continued on Page 901)

SCIENCE QUESTIONS AND ANSWERS

(Continued from Page 897)

(1. The North Star, known to astronomers as "Alpha Ursae Minoris," is 300 light years or 1,800,000,000,000 miles away from us.

2. The simplest method of finding a nearby star's distance is to use a method of triangulation. On a certain date a telescope is pointed at the star, and the angles between the star, and its neighbors in the field of the telescope are measured. Six months later the same thing is done. The earth has now moved 185,000,000 miles from its previous position. Using this as a baseline, and having the two angles, by trigonometry, the star's distance can be calculated. However for very distant stars even this method fails and a method of spectroscopy must be used.—Editor.)

THE READER SPEAKS

(Continued from Page 900)

(According to a certain modern gentleman known as Albert Einstein, time and space are parts of the same thing, neither can be divorced from the other. So if time has no reality then neither has space. The best analogy to time that we have run across is that of a river flowing from the past to the future. Traveling in time means getting out of the river (getting into another dimension) and jumping ahead to another part of the stream. Then we can anticipate the flow of events.—Editor.

A Pain in His Neck

Editor WONDER STORIES:

You'll have to pardon me if I should step on your toe, but, frankly, you give me pain in the neck, not to mention various other anatomical divisions.

Despite your loudly proclaimed policy of printing "brickbats," not a single letter protesting against the so-called "change of size" was published in the reader's column last issue. Don't say you didn't receive any! You didn't print mine, of course, it came too near to home base, but, out of fairness, if any, I expected you to print some less pointed ones. But you merely state that the change has met with nearly unanimous approval—which I don't believe, unless the readers are all crazy—then you pat yourself on the back with a few commendatory letters.

When you do publish a letter from one who is too honest or too unafraid to give his honest opinions, it is immediately followed by "letters" from "readers" who tear viciously into this most vile person who dares tell you where to get off.

I am not going to call you pet names to get my letter printed—you who have forfeited your right to editorship when you betrayed your trust to your readers by allowing such a backward measure.

I did intend to write this on a postal card so that every mail clerk between here and Queens County could read it, but I found I had too much to say.

Of course it is an "improvement" that one page is $\frac{1}{2}$ of an inch higher than its neighbor, that the edges are rough, and the paper cheap if any paper is cheap. Also that if one finds that a story by his favorite author (a rare thing to find, indeed, these days!) is on page 736, and he runs through the mag to find it, and finds himself suddenly from page 732 to page 764, or some such page.

Though, of course, you will find it convenient to politely ignore this letter, please remember that I make no secret of my name or address, that I have refrained from obscene language—a thing which you accuse one of your critics of not doing.

(Continued on Page 902)

THE Greatest SIN

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Let us face the facts of sex fearlessly and frankly, sincerely and scientifically. Let us tear the veil of shame and mystery from sex and build the future of the race on a new knowledge of all the facts of sex as they are laid bare in plain, daring but wholesome words, and frank pictures in the huge new library of Sex Knowledge.

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The Reader Speaks

(Continued from Page 901)

I regard you as one in whose hands the future of the potentially wonderful magazine, *WONDER STORIES*, is not to be trusted. As to your "improvements" to your "bigger and better magazine," pardon me while I laugh. Ha, ha, ha.

Harry Pancoast,
306 W. 28 St.,
Wilmington, Del.

Frankly, we have received very few letters of criticism on the new size and shape of *WONDER STORIES*. If there was any criticism at all, it was that some readers objected to the rough edges. This, too, is surprising because actually by count over 98% of the so-called pulp magazines on the newsstands in the small size are with rough edges.

The reason for this is purely a mechanical one and it has been accepted as standard in pulp publishing practice.

The extra cost in giving smooth edges is so trifling that we have decided with the February issue to adopt the smooth edges inasmuch as a number of our readers seem to like this style better. The extra cost for the entire edition is less than \$100.00 and we gladly contribute this amount, even if only a few readers have voiced their displeasure with the rough edges.

As to the paper, we believe we use as good or more expensive grade of paper than any of the pulp paper magazines.

As for the quality of the printing, we are spending an average of from eight to ten percent more to get better printing not only on the inside but on the outside as well.

So much for shop talk.

As to the paragraph where our correspondent claims that the pages jump suddenly from 732 to 764, he simply voices an ignorance of the production of magazines, in general. All magazines are made up in what is known as signatures of either 32 or 64 pages. These are gathered by a gathering machine which is supposed not to make any mistakes, but even machines are not infallible and sometimes it happens that due to a variation of the paper or for other mechanical reasons a signature, that is, a group of 32 pages, is dropped, or a signature is duplicated. This happens with all magazines, but it is rather an infrequent occurrence. Any reader who gets a muti-

lated copy that has duplicated signatures or has pages missing knows that his newsdealer will give him another copy in exchange, free of charge. If he cannot get satisfaction from his newsdealer, we invite him to write to us immediately and we will forward another copy.

Regarding the editor's ability to be "trusted" with the direction of *WONDER STORIES*, that is a matter for our readers to decide.—Editor.

A Magazine of Discussions

Editor, *WONDER STORIES*:

Hello there, Mr. Editor, how would you like to save some money? Well, here's your chance. Two years ago I wrote you a letter and you gave me fifty dollars for it. Well, I've giving you this one! Generous, what?

Say, mister! Just a suggestion to make. I note by the reader's discussion that more downright criticizing is done about readers and opinions in the "Reader Speaks" Column than there is about the stories in the magazine. Why not have a magazine of discussions and leave a few back pages for fiction? Ideas, eh?

No kidding, though! I am an old John Reader of your magazine and I like to sit back and hold out your magazine and say, "That's *Our Magazine*, by cracky! A magazine for the Reader's wants!" And I mean it! I like your magazine, its new size and its illustrations. One think I don't like. Don't have those author's pictures taking up space that should be used for fiction. Once seen is enough.

The best story you ever printed was in the first issue, "Warriors of Space,"—by J. P. Marshall! And you never did get us that sequel! Tsk!—Tsk!—Mr. Editor, you're not falling down on us!

Well, anyway I'm not grieving, and I'm looking forward to future issues. And I like that policy of yours which brings new authors into printdom! We like those new ones, yes sir, provided they have, as you say, a new style and a new way at striking into the vast unfathomed realms of science fictiondom.

Well, so long! Be seen in the Reader's Column some time in the next two years.

J. Harvey Haggard
932 5th St.,
San Bernardino, Cal.

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THE READER SPEAKS

(Altho there have been a few unfortunate events resulting from our policy of free and open discussions, the results are such that we are still heartily in favor of it. Friends in newspaper and magazine circles in New York tell us that we have one of the most interesting readers' columns in the city and that some of them buy the magazine chiefly to read this fascinating department.)

We only wish that space permitted us to extend this department. The Editors certainly find a great deal of enjoyment in it and for their own sake alone it would not change it.

After all science fiction is a young art—it needs continual freshness, new ideas, new authors, new readers. We are getting them all, and we are therefore happy. We would really like to know from our readers the one best story we have published so far. And we would like to know the reason why. Was it just "because", or was it because the story was exciting, plausible, thrilling, well worked out, had good atmosphere etc. Write to us and tell us about it and we'll print the best letter.—Editor)

No Place for Prejudice

Editor, WONDER STORIES:

For quite a while I have intended to air some of my thoughts and opinions on WONDER STORIES in the department reserved for that purpose. I put the matter off until now, and consequently I will write about essentials only.

Ever since December, 1926, I have intended to mention a seemingly obvious scientific error in a story in Mr. H. Gernsback's first science fiction magazine. No other reader called attention to this "error" causing me to half-believe that I was wrong and the author right. The author, Kaw, in the "Time Eliminator"—insinuated that it takes hours for light from Mars to reach the Earth!

Now that I have that out of my mind I'll devote the rest of this letter to WONDER STORIES.

The readers are constantly pointing out errors in science and what they believe are fallacies, so the magazine apologizes for errors by correcting them. But what about "errors" in other things besides science? Not typographical errors such as saying "Harold and Wilbur Wright invented the airplane, but misrepresentations that give people false impressions of a people and a country! Science fiction has no place for nationalist prejudice!

At first I tolerated Isaac R. Nathanson's piece of jingoism, then upon reading Miss Rupert's letter praising Nathanson as an artist I could no longer keep my opinion to myself without being guilty of being too lazy to write it about it.

I, too, thought "The Falling Planetoid" was good as a story, but when I came to that "jingoistic" paragraph I lost any admiration I might have had for the author. He said in brief that: "Communism-minded wretches in godless Russia" didn't care if Johnny Bull's island was wiped off the map, and citizens of the good Chinese Republic hoped that punishment might befall the country, that had taken part of Manchuria away from them. I can't find "communism-minded" in the dictionaries I possess. Communistic would have served the purpose just as well. The word seems to be like the pseudo-adverb "electronically." But this is unimportant; Nathanson would say there is no such word as "jingoistic" either.

The men who run Russia are not "wretches" and are not "communism-minded," which is meant to be a wicked state of mind by Nathanson. And even the newspapers did not say anything about "Russia taking a part of Manchuria away from the Chinese." Instead, the more liberal papers told us that the Soviet Army invaded Manchuria only to concede every foot of the invaded territory back to the Chinese. The "good Chinese Republic," with its perpetual civil war, its war lords, famine, and foreign exploiters, is not in the control of Russian battleships and troops.

Of course I know that it's the thing for most authors to slander the Soviet Republic, but in the very issue of WONDER STORIES containing "The Falling Planetoid" Francis Flagg also mentioned Russia, and in a very favorable manner, indicating that he isn't a victim of propaganda like Nathanson, and that WONDER STORIES has a liberal policy at least.

I have noted with interest that WONDER STORIES is championing several "interplanetary societies," one

(Continued on Page 904)

Radio Bargains!

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Contents

SPACE DOES NOT PERMIT US TO PRINT ALL THE FEATURES IN THE CURRENT ISSUE OF **EVERYDAY MECHANICS**. But the following titles will give you some indication of the interesting and valuable contents: Automobiles, Aviation, Chemistry, Construction Work, Electricity, Magic, Metal Work, Radio, Photography, Shop Work, Woodworking and new devices.

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ONE FOR \$1.00
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EVERYDAY MECHANICS

THE READER SPEAKS

(Continued from Page 903)

of them in Germany. Here's a plan I have to offer, and that I'm almost sure will meet the approval of other **WONDER STORIES** readers—and its authors, too.

Instead of offering monetary prizes every now and then for "picture-stories contests," why not offer prizes or the like for the best plan, design, or idea submitted that would help to solve the problem of interplanetary navigation? The authors could incorporate their ideas—genuine practical schemes—in their stories, the readers submit their ideas alone. Cooperation can accomplish more than individual effort, and surely more headway can be made when thousands, or at least hundreds, of "scientifically-minded" enthusiasts are devoting their thought to the matter, but can the concentration of a single person. The most important problem of flight into space is the creation of a suitable vehicle. The "Reader Speaks" department is meant to be a medium in which anyone may have his thoughts appear in print—if they're worth it.

Regarding the paper and title of **WONDER STORIES** I think the discarding of the word "science" from the title betitlen the intelligence of the reading public. Are they scared away from reading a magazine that has to do with *Science*—and isn't ashamed to proclaim the fact? Most of the readers who write letters to **WONDER STORIES** are attracted by and interested in science. As for the paper, just so. The printed matter is good enough, then—Also, some **WONDER STORIES** contain more information and interest than a whole issue of certain white-paper magazines.

Yours for a bigger and better **WONDER STORIES**, and practical space flying by 1940,

B. C. Jones,
127 Greenwood St.
Tamaqua, Penna.

(We are afraid that Mr. Jones missed the point of Mr. Nathanson's satire in "The Falling Planetoid." Mr. Nathanson's whole point in his story was to show that even when faced with a universal catastrophe, the nations of the earth could not forget their suspicions, jealousies, petty selfishness and backbiting. He wanted to show that from the point of view of Englishmen, the people of Russia were probably "communally-minded wretches" and that these "wretches" did not care if the English were wiped out. The Chinese likewise, were quite satisfied that the Russians should be eliminated very gently from the face of the earth. His whole point therefore was to show us that national psychology does not change even when every nation is face with utter destruction. We believe, therefore, that stories like his serve a very useful purpose in revealing to us our own stupidity.

Unfortunately it would be difficult to properly judge the merits of space flyers without a great deal of technical discussion and thought. The problem of constructing space flyers are much more involved than the layman imagines, and though **WONDER STORIES** as the magazine of prophecy, is eager to help any step toward the furthering of interplanetary travel, and its columns are always open to a discussion of its problems, it believes that the more technical features should be referred, for example, to the American Interplanetary Society.—Editor)

Ahead of the others, as usual,

Comments His Honor

Editor, WONDER STORIES:

You invite comment on the size of the new magazine. My answer is yes and no. The new size is handsomer, all right, but you seem to give us fewer stories. I am in favor of smaller pictures and more stories. But not such very small stories.

In general, I think your magazine is improving. But there is still room for improvement. I like exciting stories like "Hornets of Space." By the way, I noticed that another story by R. F. Starzl, "King of the Black Bowl" was voted the best story of the year by a straw vote of an S. C. C. committee. Quite a bouquet for **WONDER STORIES**. And curiously enough, a story along the same lines was run last week in the "Saturday Evening Post," called "King Gun" by Thomas McMorrow. The country is getting

THE READER SPEAKS

awake to the super-gangsters, and as usual *WONDER STORIES*, the magazine of prophetic fiction, was a little ahead of the others.

I couldn't make head or tail out of "The Time Annihilator." The story didn't seem to have any motive. Correct me if I'm wrong. I would like to see more stories by Sax Rohmer L. A. Eichhach, R. F. Starzl, John S. Campbell. Also some NEW stories by H. G. Wells. Above all, give us REAL stories, not just a pointless collection of scientific speculation. Deliver us from the stories in which the hero, discovering a hidden race under the earth or on some distant stars, meets a beautiful girl, who acts as his guide and explains in dull detail the new civilization among which the hero has been cast. Throw out the stories in which the hero takes part in an uprising of inferior races and kicks them all back. Are we children that we have to have the same old fairy tales? I read them all, and what science fiction needs is new ideas, real story plots, and action. Let's have them.

F. P. Petges,
Mayor of Struble, Iowa.

THE LAST CHANCE
for newsstand purchase of the Fall 1930

WONDER STORIES QUARTERLY

* * *

in this marvelous issue,

We Present

the story that created a virtual sensation in Germany and which we have imported, and translated

"BETWEEN EARTH AND
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the latest masterpiece of
OTFRID VON HANSTEIN

Also in this issue

"AN ATOMIC ADVENTURE
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"THE SECRET OF THE TOMB"
By R. Crossley Arnold

"THE STRUGGLE FOR NEPTUNE"
By Henrik Dahl Juve

"THE ISLAND OF TERROR"
By Ransome Sutton

And Others in the

FALL 1930 QUARTERLY

Four last chance to obtain a copy NOW!

(The "Time Annihilator" carries an excellent point, aside from the thrilling account of a chase through time. That point came near the end of the story, when our time explorers were attempting to wreck the laboratory of the terrible destroyer of humanity. Since the destruction of humanity was destined to occur, and in fact "had occurred" in the future, nothing that our men from the 20th century could do, could avert that future.

In this connection we refer to a letter from Mr. Allen Glasser who takes exception to our statement, "We cannot alter future events. They are written indelibly in the book of fate. All we can change is the present."

"I can give you many instances," says Mr. Glasser, "in which we can alter future consequences. Let us suppose that a man is convicted of murder and is doomed to be electrocuted on a certain date. Suppose, further, that I have incontrovertible proof that he is innocent. If I keep quiet he will die in the chair as scheduled; but if I present my evidence, he will be enabled to resume life.

(Continued on Page 906)

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AVIATION MECHANICS

97A Park Place

New York, N. Y.

THE READER SPEAKS

(Continued from Page 905)

"You might say that whatever action I took was decreed by a higher power and that man's future was in no way altered. But that would be a virtual acknowledgement of predestination—a tacit admission that we mortals are mere automata, blindly obeying the dictates of a supreme being."

Now we think that Mr. Glasser probably misunderstood us. We were referring to the attempt of men from the twentieth century to alter events that had occurred in the 23rd or 24th century. Certainly even if we admit that man can travel in time, it is absurd to believe that he can change the future, or even the past. He can in the present help to make the future, and help to unmake the past, the latter by changing things that were done in the past. For example, he can unmake an error of his of the past by, in the future, pursuing a line of conduct that is different.

This topic is such a fascinating one that we invite the full comments of our readers.—Editor.)

Shrieks to the Skies

Editor, WONDER STORIES:

I get a lot of fun out of criticizing the magazine so I'm going to try to make it a point to give you my opinion of each issue.

As a whole, I thought it was pretty good. The new size certainly was an improvement. It was much more convenient to carry, and more comfortable to hold while reading. You made a good move there all right. I don't know much about the problems involved in printing a magazine but I wonder if it's necessary to have the edges of the magazine uneven the way you have. It is very difficult to turn to any particular place in the magazine.

Then there's the matter of the cover. Is it necessary to have it quite so lurid? It makes a person darned uncomfortable to be seen in public with a magazine that shrieks to the skies. I know of no other periodical with the exception of your former magazine which boasts such a blatant cover. I guess all of these things are none of my "business," but I thought I'd just angrest them and let you do what you please with them.

In my criticisms, *fine* will mean that the story was extremely interesting and one that I enjoyed throughout; *good* will mean that the story kept my interest most of the way; *possible* will mean that the story was merely good enough to pass the time with but I didn't care for it particularly; *poor* is self explanatory.

"The Time Annihilator." *Good*.

"The House in the Clouds." *Fine*. It was better than most stories of this type in that it did not deal with a person who intended to conquer the earth but who was frustrated by the hero. However, there are one or two things which are not made clear. Why should the professor (I share your dislike of this word) build this 'drome which serves no apparent purpose, and why on earth can't he build another after the destruction of the first?

"The Invulnerable Scourge." *Good*. This story was saved from disgrace merely by the author's style. The plot or idea was unutterably ancient and boring. Must such things be?

"Lords of the Deep." A crime, an outrage! Your magazine is supposed to be science fiction, but I challenge you to present one shred of evidence that this story is such. Even that might be excused were it not for the antediluvian plot and poor treatment. You have a decision to make in my humble estimation. You have either to change the name and scope of your magazine or you'll have to stop printing such as this story.

"Hornets of Space" *Good*. Good treatment and a fairly good plot.

"War Lord of Venus." *Fine*. Bridge writes entertainingly and he has a subject that has not been exhausted. It is a pity that the story is marred by the fact that it really does not belong in the magazine.

As I said, the issue as a whole was well up to the standard of today's science fiction magazines, but there is a lack of anything outstanding in it. I await with interest a story by Ray Cummings. He is practically the only author who still writes stories equal to those

THE READER SPEAKS

that were common in the early days of science fiction. He certainly ought to inject new blood into your veins.

Philip Waite,
3460 Wayne Ave.,
New York, N. Y.

(Mr. Waite is one of the most intelligent of our younger critics, and we can always depend upon him to give us a short, brief but pungent comments on our stories. He does not waste words nor does he try to flatter or "laud" us. His judgment is unprejudiced, so say what he will, we are glad to get it.

The record for the November issue according to Mr. Waite gives us two "ones", three "goods" and one—well one that he didn't care for—as was evident. From such an astute critic we are inclined to accept this as a sign that the issue was pretty good.

We disagree with him however on the lack of science in "Lords of the Deep". The question of the relics of Easter Island is one with as many scientific implications as that of the geologic past of the race. However we are inclined to agree with him on one point. We think that the word "wonder" should suggest things of the future rather than those of the past, and our aim is to print principally stories that turn the mind forward into the future.

However we invite Mr. Waite to send us his comments each month. They are very helpful and as to those—ahem—"lurid" covers, what do our readers think?

Wife Says It's Possible

Editor, WONDER STORIES:

Both my wife and myself are regular readers of your WONDER STORIES, and naturally there are lots of stories we read that call for discussion and opinion. In a number of stories dealing with "time travelling" we both have different opinions. I contend that it is impossible for one to even think that in the future "time travelling" machines will be invented that will transport one through time to the future, say 1000 years—and my wife says that it will be possible to do so. In my opinion it makes good and instructive reading, but it will always be a dream to the authors. My wife says it is possible for it to become a reality. Kindly answer this through your reader's column and give us your opinion. Thanking you for a lot of good reading and pleasant evenings.

George Barrie,
630 N. Honnig Ave.,
Chicago, Ill.

(We should dislike to raise any discord in the now happy Barrie family by taking sides in the time travelling question. Yet as a duty to science, as well as science fiction, we must answer Mr. Barrie.

Suppose we take ourselves back three thousand years or more to the days of the biblical prophets and tried to describe to them a television machine, or a radio or an electric dynamo. The people of that time might not even have been able to conceive of what we meant, not alone picturing the instruments we were speaking about. How then can we, with any finality, picture adequately what the scientific attainments of the future will be? We are still but children peering ahead in a dimly lighted world of science. We see a few things, and men of rare genius see a little further than we. But who can really see five hundred, a thousand or five thousand years ahead?

The best that we of mortal minds can do is to say to these questions, "I don't know." To us time travelling must first be proved a *scientific* possibility; then it must be proved that a machine can be built to make use of that possibility. But possible or not, the time travelling machine provides the fascinating means of projecting ourselves into the future and seeing what the world will be like then. It is the vehicle for our hopes and dreams, so that we can see and compare those dreams with the reality.

The more we read and learn of science and its possibilities, the more we realize that each generation can only add an infinitesimal amount to the sum total of available knowledge, and can only visualize an infinitesimal amount of the great reality, and we must remain humble before the vastness that is our universe.—Editor)

(Continued on Page 908)

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Be sure to read the interesting announcement on page 772 of this issue—it's well worth spending a few minutes to read it.

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Advertisements in this section are inserted at the cost of ten cents per word for each insertion—name, initial and address each count as one word. Cash should accompany all classified advertisements unless placed by a recognized advertising agency. No less than ten words are accepted. Advertising for the February 1931 issue should be received not later than December 7th.

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THE READER SPEAKS

(Continued from Page 907)

Demands A Higher Standard

Editor, WONDER STORIES:

Contrary to the statement that *WONDER STORIES* was to be a great improvement over the former sister publications; *WONDER STORIES* is on the decline. The stories are overburdened with sinh, slush and more slush.

I will cite one of my objections. There are far too many spectacular escapes from highly developed superior beings of incredible intellect, who if they lived up to their remarkable advancement and superiority, would never be so careless as to allow the nearly — always — inexperienced — heroes — to — escape — from — them — in — such — simple — fashion — to — save — the — world — from — destruction — just — at — the — zero — hour.

So what I want is a higher literary standard! Reject stories of the dime-novel type.

Our magazines need more stories like "The White Army" by Dr. Daniel Dressler, or the "City of the Living Dead" by Laurence Manning and Fletcher Pratt in "Science Wonder Stories". Cut out stories like the "Hidden World" by Edmund Hamilton in the Fall 1929 Quarterly. Just think of covering all the enemy globes numbering so many thousands with but one sphere!

In conclusion I wish to say I am real sorry I am knocking your magazine so severely, as all my former letters have been full of praises and compliments. But I had to!

I had to demand a higher literary standard.

Arthur Berkowitz,
768 Beck St., New York, N. Y.

(We are in accord with Mr. Berkowitz with regard to the literary standard of our stories. We believe that we have achieved a high standard, which we intend to not only maintain but constantly improve. "The Hidden World" received a great deal of praise from our readers, and in another column will be found a letter from an acknowledged German authority, Mr. Willy Ley, secretary of the German Interplanetary Society who deems it one of the best that the *QUARTERLY* has produced.

However Mr. Berkowitz need not feel badly about his criticism. We want it, and when the point is well-taken we are glad to publish similar letters and throw the matter open for discussion among our readers.—Editor)

To Promote the Advancement of Science

Editor, WONDER STORIES:

Since the inception of the Science Correspondence Club two years ago, we have had at all times the assistance and sincere cooperation of the Gernsback Publications. This organization wished to express its sincere appreciation for the wonderful help you have extended us.

The Science Correspondence Club is an organization primarily of persons interested in the discussion of present day science and science fiction by correspondence. However the names of many of the most prominent scientists of the day are inscribed on our membership roll. About fifteen of the authors whose stories have appeared in *WONDER STORIES* and its predecessors are members.

The purposes of the Club is, quoting from the Constitution, "to promote the advancement of science among laymen of the world, through the use of discussion and the creation of new ideas and their exchange." We believe that this is a good expression of our aim.

A bulletin is published monthly containing articles of general interest in scientific ideas. A library is now maintained of numerous scientific books and science fiction. We have every issue of the leading magazines of this type.

The year 1931 will end with the Science Correspondence Club probably tripled in number and power over last year. Persons interested in becoming members are invited to communicate with

Paul J. McDermott, Sec.,
8834 Michigan Ave.,
Chicago, Ill.

(The progress of the Science Correspondence Club seems to be steady and healthy. We cannot but wish it every success for the coming year, for its aims are those that should appeal to all young men and women who wish a fresh current of scientific thought to enter their lives. Good luck to you!—Editor)

THE READER SPEAKS

Hands Across the Seas

Editor, WONDER STORIES:

I have now finished reading the last issue of the first year of *WONDER STORIES* and I wish to congratulate you to your authors and to your readers. Always I read with the greatest interest the column "The Reader Speaks" and I was very glad to see, that young Americans are deeply interested in science fiction and in science.

The best stories, I have found in your magazine were

An Adventure in Time
The King of the Black Bowl
The Tragedy of Spider Island (I believe, it was the best)

The Flight of the Mercury.
A Subterranean Adventure
The Thunderer
The Land of the Bipos

In the Quarterly the best were:
The Shot Into Infinity by my dear friend O. W. Gail and

The Hidden World by Edmond Hamilton.

I am sending the best wishes for the second year of *WONDER STORIES* and I hope I shall find in the next issues another fine and thrilling stories.

Willy Ley

Honorary member of the Science Correspondence Club
BERLIN NW 44
Scharnhorststr. 24, Germany

(We are happy to get this letter from Herr Ley, who is the secretary of the German Interplanetary Society, and one of the most progressive of German scientists.

By this time Herr Ley will have already received the first six numbers of our second volume, and he will see that our stories have really improved on the whole over those that he commends so heartily. At least that is the verdict of our readers.

Write to us again, Herr Ley and tell us how you think we are progressing.—*Editor*)

Without Any Complexes

Editor, WONDER STORIES:

Am sorry to see that I didn't express myself clearly enough in my last letter. But you know how it is when one condenses a letter for publication.

Now let me clear us that point of the 10%. If one comes up against a word of doubtful meaning it is always helpful to dig down to bedrock as to its real meaning. Now tripe is a very useful and necessary component of certain animals and is neither bright, clever or brilliant. But for its functions, which are all hard work and no play, it deserves respect. As does every person who takes up his cross and his duties and carries on just because it is the decent thing to do.

Ninety per cent of mankind to this in all ranks and walks of life. But there is a 10% which think they are clever and smart when they get away with things, even murder. There are people in every class and occupation of life who think they can get something for nothing, who think they can put something over on other people, who are not fundamentally honest.

Among these I reckon priests who preach with their tongues in their cheek, physicians who made drug addicts, to whom the bill is the most important object; real estate dealers who sell shabby real estate; tailors who sell shoddy for wool; auto mechanics who skimp their work; food dealers who sell putrid meat, china clay for flour and sand for sugar; wives who set their own pleasure above the well of their family; husbands who spend their earnings on themselves; employers who sweat their employees and employees who don't do an honest day's work; and so on. Have I made myself clear now about the meaning of the "tripe" 90% and the clever 10%? That real intelligence is never "clever". That only half-foaked minds are "clever, scintillating and smart". Whoever has had the pleasure to meet the really great of this world, be they scientists or preachers, teachers or philosophers, rulers or peasants, people in the lime-light or just ordinary folk, will always have found them humble and without any "side". Just ordinary hardworking "tripe". Without any complexes,

Frederick G. Hehr,

Jerusalem Ave., R.R. 1,

Hempstead, L. I., N. Y.

(Continued on Page 910)

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THE READER SPEAKS

(Since Mr. Hehr now makes himself clear we can quite agree with him about the difference between the ninety and the ten. It is unfortunately all too true that the ten are able to gobble up the good things of life, counting upon the "stupid honesty" of the ninety.

However we think that Mr. Hehr makes a mistake when he applies the word "tripe" to the ninety. Words convey their habitual meaning, and "tripe" means anything unimportant or insignificant. Now by his own words, Mr. Hehr admits, that men of great ability may be humble and honest and be classed among the ninety. Therefore these men cannot be tripe. However in the main his point is well taken, and as the philosopher says, "It takes many types to make a world..."—Editor)

A Struggle for Venus

Editor WONDER STORIES:

The stories in the December issue were great. I wish you could have had more of them in the same issue.

"The Outpost on the Moon" by Joslyn Maxwell, your new serial, was the best of all. I hope that you will have longer installments to your stories in the future. From 35 pages up. Let's have some 50 page novelettes also.

Are we going to have a sequel to "The Struggle for Venus" by Wesley Arnold? It certainly deserves one.

The rest of the stories in order of merit are:

- "The End of Times"
- "The Synthetic Men"
- "The Silent Scourge"
- "The Air-Plant Men"

The illustrations by Paul and Marchionni were very good though I miss the full page illustrations. There was but one in the December issue.

Surely you must realize how much harder it is to turn the uncut pages of a magazine. Smooth edges besides being easily turned are much neater looking.

I notice that you are using a strong grade of cover paper which is very good but it has a dull finish. I think that a bright or semi-bright paper has a much better appearance.

Jack Darrow,
4225 No. Spaulding Ave.,
Chicago, Ill.

(Mr. Darrow is right. There should be a sequel to "The Struggle for Venus." Venus is too great a prize for the Martians to give her up merely because they have been defeated once. If it were not that we would be anticipating what Mr. Arnold might tell us in a sequel, we would say that the Martians would undoubtedly make a second voyage to determine how their compatriots fared. Then they would invade Venus in force, and the serious part of the struggle would begin.

However it is a question of what value the planet would have for us. Many scientists believe that the earth will cool off when Venus is still young. When the earth is in the state that Mars is now, Venus will probably be in the condition that the earth is now. Its value then aside from all other considerations is obvious.

But we leave the field open for Mr. Arnold. We know he will give us a good story.

We have some plans for the improvement of the physical makeup of WONDER STORIES that we will announce in our next issue. Meanwhile be assured that we have the convenience of our readers always in mind.—Editor.)



THE SQUAREHEADS by William Salisbury, 168 pages, paper covers, size 5x $\frac{1}{2}$. Published by Independent Publishing Company, New Rochelle, N. Y. Price \$1.00.

Mr. Salisbury presents us with a new type of social satire using the familiar device of pushing his character into the future, into a completely mechanized socialist state. At least the customs and the habits of the people have become mechanized. It is a world filled with square-headed people, whose whole social outlook is bounded by the square. They must walk in groups of four, speak in blank verse, with phrases of four words, and in every social custom the number four must be predominant. To the reviewer the device is an unfortunate one, for once started it must be maintained by the author. It quickly becomes boring.

We see ourselves of the present day exposed by the author in all our narrow mindedness, hypocrisy, and insistence upon uniformity in our lives to the exclusion of that individuality that makes for social progress.

There are bootleggers in the future as in the present and there are policemen who for a consideration will wink at "wrongdoings."

Marriage is by eugenics in this model world, and our time traveler must perform marry a squalid beauty because her characteristics are eugenically mated to his own.

As a social satire there is not much that is original in the method and execution of this book. But all such satires have their place—for only by means of them can we become aware of our follies, our stupidities and our weaknesses and in effect "see ourselves as others see us."

THE MAN WHO MASTERED TIME by Ray Cummings, 350 pages, stiff cloth covers, size 5x8. Published by A. C. McClurg and Company, Chicago. Price \$2.00.

Ray Cummings as a teller of unusual stories has one of the qualities, at least, of H. G. Wells. Neither of these writers of science fiction presents an unusual situation to a reader and say, "Here, this is true! Believe it or not, it really happened!" Instead, their method is more subtle, or rather more insidious. They do not ask for belief, instead by carefully planned hints, by suggestion, by little personal word pictures, by their own doubts as the recompter of the tales, they prepare the reader for the startling fact that is about to be revealed. So when it comes the reader's resistance has been removed and he finds himself believing.

That quality of Cummings is nowhere more in evidence than in the present volume. Although today, readers of science fiction are accustomed, more or less, to the adventures of time travelers, the first publication of this story must have had to combat the prejudice aroused by the mere idea in it. "Travel into the future or past?" the average man probably grunted. "Absurd!"

Yet Cummings makes his story and his characters so human, and their efforts so filled with human errors that we cannot but admit at least, that time travelling might be accomplished.

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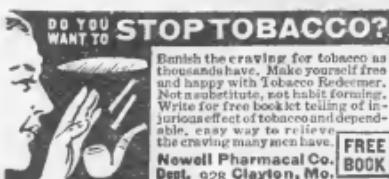
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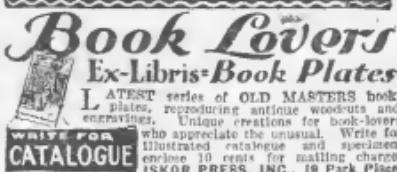
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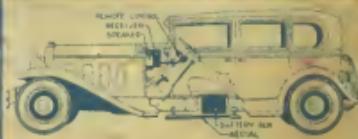
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